

Grade Level Expectations for the Sunshine State Standards

**Science
Grades 6-8**



F L O R I D A

Department
of Education

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**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Strand A: The Nature of Matter

Standard 1: The student understands that all matter has observable, measurable properties.

Benchmark SC.A.1.3.1: The student identifies various ways in which substances differ (e.g., mass, volume, shape, density, texture, and reaction to temperature and light).

Grade Level Expectations

The student:

Sixth

1. knows ways in which substances differ (for example, mass, volume, shape, density, texture, reaction to heat and light).

Seventh

1. uses a variety of measurements to describe the physical properties of matter (for example, volume and mass).

Eighth

1. determines the physical properties of matter that can be observed without altering the substance (for example, mass, volume, boiling point, density).
2. knows the difference between transparent, translucent, and opaque objects.

Benchmark SC.A.1.3.2: The student understands the difference between weight and mass.

Grade Level Expectations

The student:

Sixth

1. understands that mass is the amount of material in an object.

Seventh

1. understands that weight is the result of gravitational pull on an object.

Eighth

1. understands that weight will vary with the location of the mass in the universe, but the mass will remain constant.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.A.1.3.3: The student knows that temperature measures the average energy of motion of the particles that make up the substance.

Grade Level Expectations

The student:

Sixth

1. understands that increasing the average motion of the particles in a substance increases the temperature of the substance.
2. understands that decreasing the average motion of the particles decreases the temperature.
3. determines the effect of a change in temperature on common materials (for example, butter, food coloring in water, isopropol alcohol).

Seventh

1. knows the difference between heat and temperature.
2. 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.

Eighth

1. knows that the average kinetic energy of the atoms or molecules of different objects varies with their temperature.

Benchmark SC.A.1.3.4: The student knows that atoms in solids are close together and do not move around easily; in liquids, atoms tend to move farther apart; in gas, atoms are quite far apart and move around freely.

Grade Level Expectations

The student:

Sixth

1. understands that matter may exist as solids, liquids, and gases.
2. knows that molecular motion increases from solids to liquids to gases.

Seventh

1. knows the direction of energy flow when a change in the phase of matter occurs.

Eighth

1. understands that changes in energy cause phase changes.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.A.1.3.5: The student knows the difference between a physical change in a substance (e.g., altering the shape, form, volume, or density) and a chemical change (i.e., producing new substances with different characteristics).

Grade Level Expectations

The student:

Sixth

1. knows the physical properties of various substances.
2. knows the chemical properties of various substances.
3. knows the difference between a physical and chemical change.

Seventh

1. knows that physical changes do not result in new substances.
2. knows that chemical changes result in new substances with different characteristics.
3. knows chemical and physical changes that occur in nature.

Eighth

1. knows how to use clues (for example, change in color or form) to determine whether a change is chemical or physical.

Benchmark SC.A.1.3.6: The student knows that equal volumes of different substances may have different masses.

Grade Level Expectations

The student:

Sixth

1. knows that equal volumes of different substances may have different masses.
2. uses the water displacement method to find the volume of common items
(for example, rocks, nails, marbles).

Seventh

1. determines the volumes of different substances that have equal masses.

Eighth

1. determines the relationship between mass and volume of an assortment of common substances.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Standard 2: The student understands the basic principles of atomic theory.

Benchmark SC.A.2.3.1: The student describes and compares the properties of particles and waves.

Grade Level Expectations

The student:

Sixth

1. understands that particles and objects may be either neutral or have a positive or negative charge.
2. knows the properties of waves (frequency, amplitude, wavelength).
3. knows how to compare and contrast the properties of particles and waves.

Seventh

1. knows that charged particles and objects will attract or repel each other.
2. knows the relationship between frequency and wavelength (the greater the frequency of the wave, the smaller the wavelength of the wave).

Eighth

1. knows that matter is mostly neutral, but that particles can attain a charge by the gain or loss of electrons.
2. understands the relationship between the energy of a wave and its frequency (the greater the frequency of the wave, the greater the energy of the wave).
3. understands the relationship of energy and wavelength to the electromagnetic spectrum.

Benchmark SC.A.2.3.2: The student knows the general properties of the atom (a massive nucleus of neutral neutrons and positive protons surrounded by a cloud of negative electrons) and accepts that single atoms are not visible.

Grade Level Expectations

The student:

Sixth

1. understands the behavior of charged particles as evidenced by simple static electricity experiments.
2. determines the charge of an ion by comparing the number of protons and electrons associated with it.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Seventh

1. understands that protons and neutrons are located in the nucleus of the atom while electrons exist in areas of probability outside of the nucleus.
2. understands that the mass of an atom is concentrated in the nucleus where the protons and neutrons are located.
3. determines the mass number and atomic number of an atom from the number of protons and neutrons.
4. understands that most of the atom is empty space.

Eighth

1. knows that there is an energy difference between an electron near the nucleus and one further away.
2. knows that when electrons are transferred from one substance to another, the general properties of both substances change.

Benchmark SC.A.2.3.3: The student knows that radiation, light, and heat are forms of energy used to cook food, treat diseases, and provide energy.

Grade Level Expectations

The student:

Sixth

1. knows forms of radiant energy and their applications to everyday life (for example, visible, microwave, radio).

Seventh

1. knows uses of radiation, light, and thermal energy to improve the quality of life for human beings (for example, cooking food, treating disease).

Eighth

1. extends and refines knowledge of uses of forms of energy to improve the quality of life.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Strand B: Energy

Standard 1: The student recognizes that energy may be changed in form with varying efficiency.

Benchmark SC.B.1.3.1: The student identifies forms of energy and explains that they can be measured and compared.

Grade Level Expectations

The student:

Sixth

1. knows different types of energy and the units used to quantify the energy (for example, solar, nuclear, electrical, chemical).
2. understands that energy can be converted from one form to another (for example, solar energy to heat energy).

Seventh

1. knows examples of uses of energy in the home and ways to measure its use.

Eighth

1. understands that energy can be transferred by radiation, conduction, and convection.
2. knows examples of natural and man-made systems in which energy is transferred from one form to another.

Benchmark SC.B.1.3.2: The student knows that energy cannot be created or destroyed, but only changed from one form to another.

Grade Level Expectations

The student:

Sixth

1. understands that energy can be changed in form.
2. uses examples to demonstrate common energy transformations.

Seventh

1. knows the difference between potential and kinetic energy.
2. knows ways to change energy from potential to kinetic.

Eighth

1. understands how the principle of conservation of energy is applied during an energy transfer.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.B.1.3.3: The student knows the various forms in which energy comes to Earth from the Sun (e.g., visible light, infrared, and microwave).

Grade Level Expectations

The student:

Sixth

1. knows types of radiant energy that come to Earth from the Sun (for example, visible, infrared, ultraviolet).
2. knows the effect of sunlight on photosynthetic pigments.

Seventh

1. knows the characteristics, effects, and common uses of ultraviolet, visible and infrared light.

Eighth

1. knows ways to measure the various forms of energy that come from the Sun.

Benchmark SC.B.1.3.4: The student knows that energy conversions are never 100% efficient (e.g., some energy is transformed to heat and is unavailable for further useful work).

Grade Level Expectations

The student:

Sixth

Content addressed at seventh and eighth grades.

Seventh

1. knows that useful energy is lost as heat energy in every energy conversion.

Eighth

1. knows that energy conversions are never 100% efficient and that some energy is transformed to heat and is unavailable for further useful work (for example, a food pyramid reflects the energy that is used and lost in each part of a food chain).
2. knows that a transfer of thermal energy occurs in chemical reactions.

Benchmark SC.B.1.3.5: The student knows the processes by which thermal energy tends to flow from a system of higher temperature to a system of lower temperature.

Grade Level Expectations

The student:

Sixth

Content addressed at eighth grade.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Seventh

Content addressed at eighth grade.

Eighth

1. knows the processes by which thermal energy tends to flow from a system of higher temperature to a system of lower temperature.
2. knows that the average kinetic energy of the atoms or molecules that make up an object changes when the temperature of the object changes.
3. understands that energy changes cause weather to change (for example, formation of high and low pressure systems in the atmosphere results from changes in temperature).

Benchmark SC.B.1.3.6: The student knows the properties of waves (e.g., frequency, wavelength, and amplitude); that each wave consists of a number of crests and troughs; and the effects of different media on waves.

Grade Level Expectations

The student:

Sixth

Content addressed at eighth grade.

Seventh

Content addressed at eighth grade.

Eighth

1. knows that sound travels in a medium (cannot travel in a vacuum), and travels at different speeds through various media.
2. knows the parts of a wave (crest, trough, wavelength, amplitude).
3. understands that wavelength determines the colors of visible light.
4. understands that wavelength determines the pitch of sound.
5. knows that waves vary greatly in character (for example, sound, ultraviolet, infrared, ocean waves).

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Standard 2: The student understands the interaction of matter and energy.

Benchmark SC.B.2.3.1: The student knows that most events in the universe (e.g., weather changes, moving cars, and the transfer of a nervous impulse in the human body) involve some form of energy transfer and that these changes almost always increase the total disorder of the system and its surroundings, reducing the amount of useful energy.

Grade Level Expectations

The student:

Sixth

1. understands that energy moves through systems.

Seventh

1. knows that as the amount of useful energy of a system decreases, the total disorder in the system increases.

Eighth

1. understands that as energy is transferred from one system to another there is a reduction in the amount of useful energy.
2. knows that energy transfer is not efficient.

Benchmark SC.B.2.3.2: The student knows that most of the energy used today is derived from burning stored energy collected by organisms millions of years ago (e.g., nonrenewable fossil fuels).

Grade Level Expectations

The student:

Sixth

Content addressed at seventh and eighth grades.

Seventh

1. knows that fossil fuels are found in the Earth, they are nonrenewable, and the advantages and disadvantages of their use.

Eighth

1. understands how fossil fuels are formed in the Earth, why they are nonrenewable, and the advantages and disadvantages of their use.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Strand C: Force and Motion

Standard 1: The student understands that types of motion may be described, measured, and predicted.

Benchmark SC.C.1.3.1: The student knows that the motion of an object can be described by its position, direction of motion, and speed.

Grade Level Expectations

The student:

Sixth

1. knows that a change in motion and position can be measured.
2. knows ways to measure time intervals.
3. knows ways to estimate speed.

Seventh

1. knows that the motion of an object can be described by its position, direction of motion, and speed.

Eighth

1. knows that speed, velocity, and acceleration can be calculated, estimated, and defined.
2. knows that the magnitude of linear acceleration can be calculated.

Benchmark SC.C.1.3.2: The student knows that vibrations in materials set up wave disturbances that spread away from the source (e.g., sound and earthquake waves).

Grade Level Expectations

The student:

Sixth

1. uses common items (a pebble dropped in water, a marble dropped in sand) to demonstrate that vibrations in materials set up visible disturbances that spread away from a force in all directions.

Seventh

1. knows factors that influence the amount of damage vibrations can cause.
2. knows intensity of some common waves.
3. knows some causes and effects of waves.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Eighth

1. knows ways to measure the frequency of waves.
2. knows some technological devices that use wave energy (for example, sonar, ultrasound, laser).

Standard 2: The student understands that the types of force that act on an object and the effect of that force can be described, measured, and predicted.

Benchmark SC.C.2.3.1: The student knows that many forces (e.g., gravitational, electrical, and magnetic) act at a distance (e.g., without contact).

Grade Level Expectations

The student:

Sixth

Content addressed at seventh and eighth grades.

Seventh

1. knows the properties of forces.
2. knows that like poles of the magnet (two north poles or two south poles) will repel and opposite poles (north and south) will attract.
3. knows that a simple electromagnet uses both electrical force and a magnetic force.
4. knows the difference between parallel and series circuits.

Eighth

1. knows that many forces act at a distance.

Benchmark SC.C.2.3.2: The student knows common contact forces.

Grade Level Expectations

The student:

Sixth

Content addressed at eighth grade.

Seventh

Content addressed at eighth grade.

Eighth

1. knows some common contact forces (for example, friction, buoyancy, tension).

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.C.2.3.3: The student knows that if more than one force acts on an object, then the forces can reinforce or cancel each other, depending on their direction and magnitude.

Grade Level Expectations

The student:

Sixth

1. recognizes the result of several forces acting on an object.
2. knows that the net force is dependent on the direction and magnitude of forces acting on a body.

Seventh

1. knows that objects in a vacuum accelerate at a constant rate.
2. understands that as objects fall to Earth, speed increases until they reach terminal velocity.

Eighth

1. recognizes the forces that act on a given object.
2. knows that the overall effect of a force can be predicted.
3. knows that forces may be balanced or unbalanced.
4. understands that unbalanced forces cause objects to accelerate.

Benchmark SC.C.2.3.4: The student knows that simple machines can be used to change the direction or size of a force.

Grade Level Expectations

The student:

Sixth

1. knows uses of simple machines.
2. knows advantages and disadvantages of simple machines.

Seventh

1. understands uses and combinations of simple machines in complicated machines.

Eighth

1. knows that simple machines can be used to change the direction or size of a force.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.C.2.3.5: The student understands that an object in motion will continue at a constant speed and in a straight line until acted upon by a force and that an object at rest will remain at rest until acted upon by a force.

Grade Level Expectations

The student:

Sixth

1. knows that an object at rest will stay at rest unless acted upon by an outside force.
2. knows objects in motion will remain in motion unless acted upon by an outside force.

Seventh

Content covered at sixth and eighth grades.

Eighth

1. understands that an object in motion will continue at a constant speed and in a straight line until acted upon by a force and that an object at rest will remain at rest until acted upon by a force.

Benchmark SC.C.2.3.6: The student explains and shows the ways in which a net force (that is, the sum of all acting forces) can act on an object (e.g., speeding up an object traveling in the same direction as the net force, slowing down an object traveling in the direction opposite of the net force).

Grade Level Expectations

The student:

Sixth

Content addressed at eighth grade.

Seventh

Content addressed at eighth grade.

Eighth

1. knows ways in which a net force (for example, the sum of all acting forces) can act on an object (for example, speeding up an object traveling in the same direction as the net force, slowing down an object traveling in the direction opposite of the net force).

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.C.2.3.7: The student knows that gravity is a universal force that every mass exerts on every other mass.

Grade Level Expectations

The student:

Sixth

1. knows that gravity is a force that causes an object to fall to the ground.
2. knows that gravity causes an object to have weight.

Seventh

1. understands that gravity is a force exerted on a mass that causes an object to have weight.
2. knows that gravity is a force that holds the Solar System together.

Eighth

1. knows that gravity is a universal force that every mass exerts on every other mass.

Strand D: Processes that Shape the Earth

Standard 1: The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.

Benchmark SC.D.1.3.1: The student knows that mechanical and chemical activities shape and reshape the Earth's land surface by eroding rock and soil in some areas and depositing them in other areas, sometimes in seasonal layers.

Grade Level Expectations

The student:

Sixth

1. understands that the surface of the Earth is constantly changing due to mechanical and chemical action.

Seventh

1. knows the relationship between run-off and the development of a river system.
2. understands the action of ground water to form aquifers, caverns, and sinkholes.
3. knows the ways in which the Earth's surface is eroded and reshaped (for example, weathering, erosion, deposition).

Eighth

1. uses observations and tests to identify mineral samples.
2. understands how sedimentary, igneous, and metamorphic rocks are formed and categorized.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.D.1.3.2: The student knows that over the whole Earth, organisms are growing, dying, and decaying as new organisms are produced by the old ones.

Grade Level Expectations

The student:

Sixth

1. knows that sedimentary rock may contain fossils of plants, animals, and microbes.
2. knows ways the systems of Earth change over time and predicts the causes of the change.

Seventh

1. 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.

Eighth

1. knows that over the whole Earth, organisms are growing, dying, and decaying and new organisms are being produced.

Benchmark SC.D.1.3.3: The student knows how conditions that exist in one system influence the conditions that exist in other systems.

Grade Level Expectations

The student:

Sixth

1. knows that different events on the Earth change features on Earth (for example, hurricanes, earthquakes, volcanoes).

Seventh

1. understands that changes on the surface of the Earth affect living systems.

Eighth

1. knows ways conditions that exist in one system influence the conditions that exist in other systems (for example, the relationship between mountain building, island formation, and trench formation; interactions between the atmosphere and hydrosphere affect weather patterns).

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.D.1.3.4: The student knows the ways in which plants and animals reshape the landscape (e.g., bacteria, fungi, worms, rodents, and other organisms add organic matter to the soil, increasing soil fertility, encouraging plant growth, and strengthening resistance to erosion).

Grade Level Expectations

The student:

Sixth

1. records seasonal changes of the landscape in a specific area over time.
2. knows ways that plants and animals reconstitute the soil and alter the landscape.
3. understands the processes that prevent or cause erosion.

Seventh

1. 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).

Eighth

1. extends and refines knowledge of ways in which living things reshape the landscape.

Benchmark SC.D.1.3.5: The student understands concepts of time and size relating to the interaction of Earth's processes (e.g., lightning striking in a split second as opposed to the shifting of the Earth's plates altering the landscape, distance between atoms measured in Angstrom units as opposed to distance between stars measured in light-years).

Grade Level Expectations

The student:

Sixth

1. understands the range of time over which natural events occur (for example, lightning in seconds, mountains form over many years).

Seventh

1. uses a geologic timeline to illustrate the occurrence of processes on Earth.

Eighth

1. understands concepts of time and size relating to the interaction of Earth's processes (for example, the distance between atoms measured in Angstrom units as opposed to distance between stars measured in light-years).

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Standard 2: The student understands the need for protection of the natural systems on Earth.

Benchmark SC.D.2.3.1: The student understands that quality of life is relevant to personal experience.

Grade Level Expectations

The student:

Sixth

1. knows that a change in the environment affects the quality of life in different ways for different organisms.

Seventh

1. knows ways to conserve and recycle resources (for example, develops and uses a personal action plan to use recyclable materials whenever possible).

Eighth

1. understands that quality of life is relevant to personal experience.

Benchmark SC.D.2.3.2: The student knows the positive and negative consequences of human action on the Earth's systems.

Grade Level Expectations

The student:

Sixth

1. knows positive and negative consequences of human action on the Earth's systems (for example, farming, transportation, mining, manufacturing).

Seventh

1. knows roles of various public and private environmental agencies (for example, Florida Water Management Districts, Environmental Protection Agency).

Eighth

1. knows that legislation can be adopted to protect the Earth from detrimental human activities.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Strand E: Earth and Space

Standard 1: The student understands the interaction and organization in the Solar System and the universe and how this affects life on Earth.

Benchmark SC.E.1.3.1: The student understands the vast size of our Solar System and the relationship of the planets and their satellites.

Grade Level Expectations

The student:

Sixth

1. knows the relationship between tides on Earth and the positions of the Moon, the Sun, and Earth.
2. knows the relative sizes of the planets, Sun, Solar System, galaxy, and universe.
3. understands the positions of the Earth, Moon, and Sun during a solar eclipse and a lunar eclipse.

Seventh

1. knows the relative sizes of planets.
2. understands the distances of the planets and the asteroid belt from the Sun are vast.
3. 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.
4. 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.
5. understands that the tilt of the Earth on its axis as it rotates causes seasonal changes.

Eighth

Covered at sixth and seventh grades.

Benchmark SC.E.1.3.2: The student knows that available data from various satellite probes show the similarities and differences among planets and their moons in the Solar System.

Grade Level Expectations

The student:

Sixth

Content addressed at seventh and eighth grades.

Seventh

1. knows characteristics of the inner planets and outer planets.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

2. knows basic features of the Moon and the moons of other planets.

Eighth

1. knows that available data from various satellite probes show similarities and differences among planets and their moons in our Solar System.

Benchmark SC.E.1.3.3: The student understands that our Sun is one of many stars in our galaxy.

Grade Level Expectations

The student:

Sixth

1. understands that our Sun is one of many stars in our galaxy.

Seventh

1. knows some of the constellations of stars in the sky.
2. knows why stars appear to move across the sky.

Eighth

1. knows the size, temperature, age, and brightness of the Sun compared to some other stars in the Milky Way Galaxy (for example, white dwarfs, red giants).

Benchmark SC.E.1.3.4: The student knows that stars appear to be made of similar chemical elements, although they differ in age, size, temperature, and distance.

Grade Level Expectations

The student:

Sixth

Content addressed at seventh and eighth grades.

Seventh

1. knows the life cycle of a star.
2. knows the process used to determine the age of a star.

Eighth

1. knows that stars appear to be made of similar chemical elements, although they differ in age, size, temperature, and distance.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Standard 2: The student recognizes the vastness of the universe and the Earth's place in it.

Benchmark SC.E.2.3.1: The student knows that thousands of other galaxies appear to have the same elements, forces, and forms of energy found in our Solar System.

Grade Level Expectations

The student:

Sixth

Content addressed in eighth grade.

Seventh

Content addressed in eighth grade.

Eighth

1. knows that thousands of other galaxies appear to have the same elements, forces, and forms of energy found in our Solar System.

Strand F: Processes of Life

Standard 1: The student describes patterns of structure and function in living things

Benchmark SC.F.1.3.1: The student understands that living things are composed of major systems that function in reproduction, growth, maintenance, and regulation.

Grade Level Expectations

The student:

Sixth

1. knows ways systems in an organism function and interact (for example, the muscular system provides the ability to move and is supported by the skeletal system when one is present.
2. understands the differences between growth and maintenance.

Seventh

1. understands that the systems within living things respond to changes in the environment (for example, allergens and carcinogens).

Eighth

1. understands that living things are composed of major systems that function in reproduction, growth, maintenance, and regulation.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.F.1.3.2: The student knows that the structural basis of most organisms is the cell and most organisms are single cells, while some, including humans, are multicellular.

Grade Level Expectations

The student:

Sixth

1. knows that the cell is the basic unit of structure and function in all living things.
2. knows that there is great diversity among unicellular organisms.
3. knows the basic processes that occur in cells.

Seventh

1. understands the concept of multicellular organisms.

Eighth

1. knows the structures of cells, and their function and ways these mirror the structure and function of multicellular organisms.
2. understands that cells of unicellular organisms are similar to those of multicellular organisms.

Benchmark SC.F.1.3.3: The student knows that in multicellular organisms cells grow and divide to make more cells in order to form and repair various organs and tissues.

Grade Level Expectations

The student:

Sixth

1. knows that in multicellular organisms cells grow and divide to form and repair various organs and tissues.
2. understands cells reproduce to ensure the growth and repair of tissue.

Seventh

Content addressed at sixth and eighth grades.

Eighth

1. knows the processes of division, growth, and maturation that occur during the cell cycle.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.F.1.3.4: The student knows that the levels of structural organization for function in living things include cells, tissues, organs, systems, and organisms.

Grade Level Expectations

The student:

Sixth

1. knows that the levels of structural organization in living things include cells, tissues, organs, systems, and organisms.

Seventh

Content addressed at sixth and eighth grades.

Eighth

1. knows some of the functions of some types of cells, tissues, organs, and systems in advanced organisms.

Benchmark SC.F.1.3.5: The student explains how the life functions of organisms are related to what occurs within the cell.

Grade Level Expectations

The student:

Sixth

1. understands that there are structures with particular functions that are unique to certain types of cells (for example, plant cells have cell walls, animal cells do not).
2. understands the process of osmosis and diffusion.
3. knows the essential functions in cells.

Seventh

Content addressed at sixth and eighth grades.

Eighth

1. understands that the diversity of cell structure permits a diversity of functions for the organism.
2. knows that the cell is a system of organelles that mirrors the systems within multicellular organisms.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.F.1.3.6: The student knows that the cells with similar functions have similar structures, whereas those with different structures have different functions.

Grade Level Expectations

The student:

Sixth

1. uses or constructs models of plant and animal cells to identify the basic structures of each.
2. knows the functions of structures in plant and animal cells.

Seventh

1. understands that there are many similarities among the great diversity of living things.

Eighth

nows that the cells with similar functions have similar structures, whereas those with different structures have different functions.

2. uses tools to identify and compare cell structures (for example, microscope, hand lenses, bioscopes).

Benchmark SC.F.1.3.7: The student knows that behavior is a response to the environment and influences growth, development, maintenance, and reproduction.

Grade Level Expectations

The student:

Sixth

1. knows that behavior is a response to the environment.

Seventh

1. determines the behavioral responses of different organisms to common stimuli (for example, temperature, light, pressure, moisture).

Eighth

1. knows ways behaviors that are responses to the environment may alter the normal growth, development, maintenance, and reproduction of an organism.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Standard 2: The student understands the process and importance of genetic diversity.

Benchmark SC.F.2.3.1: The student knows the patterns and advantages of sexual and asexual reproduction in plants and animals.

Grade Level Expectations

The student:

Sixth

Content addressed at seventh and eighth grades.

Seventh

1. knows the differences between and advantages of sexual and asexual reproduction.
2. knows common types of asexual reproduction.

Eighth

1. knows the difference between spores and seeds in plant reproduction.
2. knows that the flower is the reproductive body of a vascular plant and that it is adapted for pollination.
3. knows the difference between meiosis and mitosis and when each occurs.

Benchmark SC.F.2.3.2: The student knows that the variation in each species is due to the exchange and interaction of genetic information as it is passed from parent to offspring.

Grade Level Expectations

The student:

Sixth

Content addressed at eighth grade.

Seventh

Content addressed at eighth grade.

Eighth

1. knows how dominant and recessive traits are inherited.
2. uses a Punnett square to predict the results of crosses between pure and hybrid organisms.
3. knows that variations within a species are the result of genetic information being passed from a parent to offspring and that interactions between the genes may occur in the process (for example, blending, crossing-over).

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.F.2.3.3: The student knows that generally organisms in a population live long enough to reproduce because they have survival characteristics.

Grade Level Expectations

The student:

Sixth

1. knows adaptations that aid in species survival (for example, protective coloration, hibernation, delayed implantation).

Seventh

1. knows the life cycles of a variety of organisms, including non-flowering and flowering plants, insects, amphibians, reptiles, birds, and mammals.

Eighth

1. knows ways organisms are adapted to their environment.
2. understands that species have characteristics that enable their populations to cycle within varying periods of time (minutes to hundreds of years).

Benchmark SC.F.2.3.4: The student knows that the fossil record provides evidence that changes in the kinds of plants and animals in the environment have been occurring over time.

Grade Level Expectations

The student:

Sixth

Content addressed at eighth grade.

Seventh

Content addressed at eighth grade.

Eighth

1. knows that the fossil record provides evidence that changes in the kinds of plants and animals in the environment have been occurring over time.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Strand G: How Living Things Interact with Their Environment

Standard 1: The student understands the competitive, interdependent, cyclic nature of living things in the environment.

Benchmark SC.G.1.3.1: The student knows that viruses depend on other living things.

Grade Level Expectations

The student:

Sixth

Content addressed at seventh grade.

Seventh

1. knows the unique characteristics of a virus that cause them to be considered living at some times and nonliving at others.
2. knows ways that viruses depend on other living things.
3. knows that viruses may cause diseases in other living things.

Eighth

Content addressed at seventh grade.

Benchmark SC.G.1.3.2: The student knows that biological adaptations include changes in structures, behaviors, or physiology that enhance reproductive success in a particular environment.

Grade Level Expectations

The student:

Sixth

Content addressed at seventh grade.

Seventh

1. knows that biological adaptations include changes in structures, behaviors, or physiology that enhance reproductive success in a particular environment.

Eighth

Content addressed at seventh grade.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.G.1.3.3: The student understands that the classification of living things is based on a given set of criteria and is a tool for understanding biodiversity and interrelationships.

Grade Level Expectations

The student:

Sixth

1. understands that living things are sorted for convenience and identification.
2. understands that the structural characteristics among animals and plants are more alike as organisms are closer to the same kind or species within a classification level.

Seventh

1. knows how to design and use a dichotomous guide to identify organisms based on structural characteristics.

Eighth

Content addressed at sixth and seventh grades.

Benchmark SC.G.1.3.4: The student knows that the interactions of organisms with each other and with the non-living parts of their environments result in the flow of energy and the cycling of matter throughout the system.

Grade Level Expectations

The student:

Sixth

1. knows the nonliving (abiotic) and living (biotic) aspects of an ecosystem.
2. understands how the components of an ecosystem interact.
3. understands that food chains show specific trophic relationships and food webs are used to illustrate interrelationships of trophic levels.

Seventh

1. understands how the carbon dioxide-oxygen cycle, water cycle, and nitrogen cycle are important for the survival of organisms.
2. knows the interrelationships in a local ecosystem.

Eighth

Content addressed at sixth and seventh grades.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.G.1.3.5: The student knows that life is maintained by a continuous input of energy from the sun and by the recycling of the atoms that make up the molecules of living organisms.

Grade Level Expectations

The student:

Sixth

Content addressed at seventh grade.

Seventh

1. understands ways matter is recycled (for example, water cycle, carbon cycle).
2. knows that life on earth is dependent upon a continuous supply of energy from the sun.
3. understands that individual food chains occur within a food web and that both show the flow of energy.

Eighth

Content addressed at seventh grade.

Standard 2: The student understands the consequences of using limited natural resources.

Benchmark SC.G.2.3.1: The student knows that some resources are renewable and others are nonrenewable.

Grade Level Expectations

The student:

Sixth

1. knows renewable and nonrenewable energy sources.

Seventh

1. understands the importance of informed use of natural resources.

Eighth

1. knows that some resources are renewable and others are nonrenewable.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.G.2.3.2: The student knows that all biotic and abiotic factors are interrelated and that if one factor is changed or removed, it impacts the availability of other resources within the system.

Grade Level Expectations

The student:

Sixth

1. distinguishes between biotic and abiotic factors in the environment.

Seventh

1. knows biotic and abiotic components in a small, local area and ways they interact (for example, field, pond).
2. understands the consequences that might result when changes occur in populations.
3. understands that changes in one part of the ecosystem will affect other parts of the ecosystem.

Eighth

Content addressed at sixth and seventh grades.

Benchmark SC.G.2.3.3: The student knows that a brief change in the limited resources of an ecosystem may alter the size of a population or the average size of individual organisms and that long-term change may result in the elimination of animal and plant populations inhabiting the Earth.

Grade Level Expectations

The student:

Sixth

1. understands that changes in the environment may influence the size, number, or diversity of organisms in an area.

Seventh

1. knows possible causes for a species to become threatened, endangered, or extinct.

Eighth

1. understands that changes in the environment cause changes in populations.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.G.2.3.4: The student understands that humans are a part of an ecosystem and their activities may deliberately or inadvertently alter the equilibrium in ecosystems.

Grade Level Expectations

The student:

Sixth

1. understands that humans are a part of an ecosystem and their activities may deliberately or inadvertently alter the equilibrium in the ecosystem.

Seventh

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

Eighth

1. extends and refines knowledge of ways that human activities may deliberately or inadvertently alter the equilibrium in the ecosystem.

Strand H: The Nature of Science

Standard 1: The student uses the scientific processes and habits of mind to solve problems.

Benchmark SC.H.1.3.1: The student knows that scientific knowledge is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way.

Grade Level Expectations

The student:

Sixth

1. knows ways scientific theories may change with new discoveries.
2. understands that new technology may lead to new discoveries.

Seventh

1. understands that new scientific knowledge is often used to reevaluate existing theories.

Eighth

1. knows that scientific knowledge is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.H.1.3.2: The student knows that the study of the events that led scientists to discoveries can provide information about the inquiry process and its effects.

Grade Level Expectations

The student:

Sixth

1. uses systematic, scientific processes to develop and test hypotheses.
2. knows that the scientific method is a process that involves a logical and empirical but flexible approach to problem solving.

Seventh

1. uses systematic, scientific processes to solve problems and reach conclusions.

Eighth

1. extends and refines use of systematic, scientific processes to develop and test hypotheses.
2. knows that the study of the events that led scientists to discoveries can provide information about the inquiry process and its effects.

Benchmark SC.H.1.3.3: The student knows that science disciplines differ from one another in topic, techniques, and outcomes but that they share a common purpose, philosophy, and enterprise.

Grade Level Expectations

The student:

Sixth

1. knows that the disciplines of science provide in depth study and information that becomes available for all to share and use.

Seventh

1. knows that science disciplines differ from one another in topic, techniques, and outcomes but that they share a common purpose, philosophy, and enterprise.

Eighth

2. extends and refines knowledge that science disciplines differ from one another in topic, techniques, and outcomes but that they share a common purpose, philosophy, and enterprise.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Benchmark SC.H.1.3.4: The student knows that accurate record keeping, openness, and replication are essential to maintaining an investigator's credibility with other scientists and society.

Grade Level Expectations

The student:

Sixth

1. knows that accurate record keeping, openness, and replication are essential to maintaining an investigator's credibility with other scientists and society.
2. uses accurate records, openness, and replication of experiments to ensure credibility.

Seventh

1. extends and refines use of accurate records, openness, and replication of experiments to ensure credibility.

Eighth

1. extends and refines use of accurate records, openness, and replication of experiments to ensure credibility.

Benchmark SC.H.1.3.5: The student knows that a change in one or more variables may alter the outcome of an investigation.

Grade Level Expectations

The student:

Sixth

1. understands the importance of the control in an experiment.
2. knows how to identify the independent and dependent variables in an experiment.
3. uses appropriate experimental design, with consideration for rules, time, and materials required to solve a problem.

Seventh

1. extends and refines knowledge of how to identify the independent and dependent variables in an experiment.
2. extends and refines use of appropriate experimental design, with consideration for rules, time, and materials required to solve a problem.
3. uses rules, time, and materials in ways that ensure the identification and separation of variables in an experiment to solve a problem.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Eighth

1. extends and refines knowledge of how to identify the independent and dependent variables in an experiment.
2. extends and refines use of appropriate experimental design, with consideration for rules, time, and materials required to solve a problem.
3. extends and refines use of rules, time, and materials in ways that ensure the identification and separation of variables in an experiment to solve a problem.

Benchmark SC.H.1.3.6: The student recognizes the scientific contributions that are made by individuals of diverse backgrounds, interests, talents, and motivations.

Grade Level Expectations

The student:

Sixth

1. knows selected scientists and their accomplishments.
2. knows that scientists who make contributions to knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.

Seventh

1. extends and refines knowledge of selected scientists and their accomplishments and recognizes their varied backgrounds, talents, interests, and goals.

Eighth

1. extends and refines knowledge of selected scientists and their accomplishments and recognizes their varied backgrounds, talents, interests, and goals.

Benchmark SC.H.1.3.7: The student knows that when similar investigations give different results, the scientific challenge is to verify whether the differences are significant by further study.

Grade Level Expectations

The student:

Sixth

1. uses criteria necessary to determine the veracity of the data.

Seventh

1. uses criteria necessary to determine the validity of a scientific experiment.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Eighth

1. extends and refines use of criteria necessary to determine the validity of a scientific experiment.
2. knows that statistical tests are used to confirm the significance of data.

Standard 2: The student understands that most natural events occur in comprehensible, consistent patterns.

Benchmark SC.H.2.3.1: The student recognizes that patterns exist within and across systems.

Grade Level Expectations

The student:

Sixth

1. knows that most natural events occur in patterns.

Seventh

1. knows that natural events (for example, seasons, hurricanes) occur in patterns.

Eighth

1. understands the importance for looking for patterns in natural events.

Standard 3: The student understands that science, technology, and society are interwoven and interdependent.

Benchmark SC.H.3.3.1: The student knows that science ethics demand that scientists must not knowingly subject coworkers, students, the neighborhood, or the community to health or property risks.

Grade Level Expectations

The student:

Sixth

1. knows that science ethics demand that scientists must not knowingly subject coworkers, students, the neighborhood, or the community to health or property risks.
2. uses appropriate procedures for safety in the classroom, home, and community.

Seventh

1. knows that science ethics demand that scientists must not knowingly subject coworkers, students, the neighborhood, or the community to health or property risks.
2. uses appropriate procedures for safety in the classroom, home, and community.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Eighth

1. knows that science ethics demand that scientists must not knowingly subject coworkers, students, the neighborhood, or the community to health or property risks.
2. uses appropriate procedures for safety in the classroom, home, and community.

Benchmark SC.H.3.3.2: The student knows that special care must be taken in using animals in scientific research.

Grade Level Expectations

The student:

Sixth

1. knows that appropriate care, safe practices, and ethical treatment are necessary when animals are involved in scientific research.

Seventh

1. knows the care, safe practices, and ethical treatment that are appropriate when using animals in field and laboratory research.

Eighth

1. extends and refines knowledge of the care, safe practices, and ethical treatment that are appropriate when using animals in field and laboratory research.

Benchmark SC.H.3.3.3: The student 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.

Grade Level Expectations

The student:

Sixth

1. 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.

Seventh

1. 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.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Eighth

1. 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.

Benchmark SC.H.3.3.4: The student knows that technological design should require taking into account constraints such as natural laws, the properties of the materials used, and economic, political, social, ethical, and aesthetic values.

Grade Level Expectations

The student:

Sixth

1. knows some ways that scientific discoveries create new technologies that affect society (for example, geographic information systems, gene mapping, electronic communication).

Seventh

1. knows that the designs used for technological improvements should consider the values of society (economic, political, social, ethical, aesthetic).
2. uses knowledge of political, social, and economic ramifications of certain scientific research to evaluate its role in society.

Eighth

1. knows that technological design should require taking into account constraints such as natural laws, the properties of the materials used, and economic, political, social, ethical, and aesthetic values.

Benchmark SC.H.3.3.5: The student understands that contributions to the advancement of science, mathematics, and technology have been made by different kinds of people, in different cultures, at different times and are an intrinsic part of the development of human culture.

Grade Level Expectations

The student:

Sixth

1. knows that the advancement of science, mathematics, and technology is ongoing and influenced by a diverse population of scientists.

Seventh

1. knows that scientific and technological contributions are made by individuals of different ethnic, economic, and cultural backgrounds.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**

Eighth

1. understands that contributions to the advancement of science, mathematics, and technology have been made by different kinds of people, in different cultures, at different times and are an intrinsic part of the development of human culture.

Benchmark SC.H.3.3.6: The student knows that no matter who does science and mathematics or invents things, or when or where they do it, the knowledge and technology that result can eventually become available to everyone.

Grade Level Expectations

The student:

Sixth

1. knows that scientific contributions may result in diverse technological products.

Seventh

1. knows that scientific contributions may result in diverse technological products.

Eighth

1. knows that no matter who does science and mathematics or invents things, or when or where they do it, the knowledge and technology that result can eventually become available to everyone.
2. knows ways the scientific enterprise is global and available to all.

Benchmark SC.H.3.3.7: The student knows that computers speed up and extend people's ability to collect, sort, and analyze data; prepare research reports; and share data and ideas with others.

Grade Level Expectations

The student:

Sixth

1. uses a computer to collect, analyze, and report scientific findings.

Seventh

1. extends and refines use of a computer to collect, analyze, and report scientific findings.

Eighth

1. uses a variety of technologies to collect, analyze, and report scientific findings.
2. knows that the quantity of scientific information available is increasing at an exponential rate due to the advances in technology.

**Sunshine State Standards
Grade Level Expectations
Science
Grades 6-8**



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