

Subject Area: Science
Strand A: The Nature of Matter

Benchmarks

SC.A.1.2.1: The student determines that the properties of materials (e.g., density and volume) can be compared and measured (e.g., using rulers, balances, and thermometers).

SC.A.1.2.3: The student knows that the weight of an object always equals the sum of its parts.

SC.A.2.2.1: The student knows that materials may be made of parts too small to be seen without magnification.

TASK ANALYSIS

The student...

PROPERTIES OF MATTER

- draws and records in a journal, observations of a material, such as Styrofoam, using the naked eye, a hand lens, and a microscope.
- measures matter using various tools such as rulers, thermometers, balances, and graduated cylinders.
- compares and contrasts the physical properties of matter by making both quantitative and qualitative observations.
- determines the mass of equal volumes of various materials using metric tools.
- determines the mass of a given volume of water to discover that the mass and volume of water are equal (e.g., 10 milliliters of water = 10 grams).
- compares the weight or mass of an object to the sum of its parts using a spring scale or balance.

Subject Area: Science
Strand A: The Nature of Matter

Benchmarks

SC.A.1.2.1: The student determines that the properties of materials (e.g., density and volume) can be compared and measured (e.g., using rulers, balances, and thermometers).

SC.A.1.2.2: The student knows that common materials (e.g., water) can be changed from one state to another by heating and cooling.

SC.A.1.2.3: The student knows that the weight of an object always equals the sum of its parts.

SC.A.1.2.4: The student knows that different materials are made by physically combining substances and that different objects can be made by combining different materials.

SC.A.1.2.5: The student knows that materials made by chemically combining two or more substances may have properties that differ from the original materials.

TASK ANALYSIS	
The student...	
	PHYSICAL AND CHEMICAL CHANGES
	<ul style="list-style-type: none">determines the properties of an object using qualitative observations and metric measurements that incorporate tools such as rulers, thermometers, balances, and graduated cylinders.compares the mass of an object to the sum of its parts.physically combines different materials to create mixtures.separates a mixture by sorting, sifting, filtering, and evaporating.demonstrates that physical changes in the states of matter can be produced by heating and cooling.observes the original materials and compares their properties to the properties of the new material produced in a chemical reaction.

Subject Area: Science
Strand B: Energy

Benchmarks

SC.B.1.2.1: The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).

SC.B.1.2.2: The student recognizes various forms of energy (e.g., heat, light, and electricity).

SC.B.1.2.4: The student knows the many ways in which energy can be transformed from one type to another.

SC.C.2.2.1: The student recognizes that forces of gravity, magnetism, and electricity operate simple machines.

TASK ANALYSIS	
The student...	
	ELECTRICITY AND MAGNETISM
	<ul style="list-style-type: none">experiences the effects of statically charged objects on other objects.designs a complete circuit to convert electric potential energy to light energy.investigates the basic principles of magnetism and relates them to the earth's magnetic fields.constructs an electromagnet and conducts experiments to observe the relationship between electricity and magnetism.designs and creates electric circuits used to operate machines (e.g., spin art, galvanometer).

Subject Area: Science
Strand B: Energy

Benchmarks

<p>SC.A.1.2.2: The student knows that common materials (e.g., water) can be changed from one state to another by heating and cooling.</p> <p>SC.B.1.2.1: The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).</p> <p>SC.B.1.2.2: The student recognizes various forms of energy (e.g., heat, light, and electricity).</p> <p>SC.B.1.2.3: The student knows that most things that emit light also emit heat.</p> <p>SC.B.1.2.4: The student knows the many ways in which energy can be transformed from one type to another.</p> <p>SC.B.1.2.5: The student knows that various forms of energy (e.g., mechanical, chemical, electrical, magnetic, nuclear, and radiant) can be measured in ways that make it possible to determine the amount of energy that is transformed.</p> <p>SC.B.1.2.6: The student knows ways that heat can move from one object to another.</p> <p>SC.B.2.2.2: The student recognizes the costs and risks to society and the environment posed by the use of nonrenewable energy.</p> <p>SC.B.2.2.3: The student knows that the limited supply of usable energy sources (e.g., fuels such as coal or oil) places great significance on the development of renewable energy sources.</p> <p>SC.E.1.2.3: The student knows that the Sun is a star and that its energy can be captured or concentrated to generate heat and light for work on Earth.</p>

TASK ANALYSIS	
The student...	ENERGY
	<ul style="list-style-type: none"> defines energy as the ability to do work or to exert a force and recognizes that work is done every time a force is used to move something.
	<ul style="list-style-type: none"> describes energy as stored energy (potential) or energy of motion (kinetic).
	<ul style="list-style-type: none"> recognizes that energy comes in many different forms: (e.g., mechanical, energy of position and motion; electrical, energy of moving electrons; chemical, energy stored in chemical bonds; thermal, heat energy - the energy of moving and vibrating molecules; nuclear, energy contained in the nuclei of atoms; and radiant, energy that travels in waves like sunlight).
	<ul style="list-style-type: none"> measures the gain or loss of energy by using a variety of tools (e.g., thermometer, electric meter, meter stick).
	<ul style="list-style-type: none"> demonstrates that light travels very rapidly in straight lines. When it strikes an object, light is reflected, absorbed, or it passes through causing it to be refracted.
	<ul style="list-style-type: none"> discovers through experiences ways that energy can be transformed from one form to another (e.g., electricity to light, light to heat, mechanical to heat, potential to kinetic).
	<ul style="list-style-type: none"> demonstrates that heating and cooling cause changes in the properties of materials and that many kinds of changes occur faster under hotter conditions.
	<ul style="list-style-type: none"> experiments to discover that some materials conduct heat much better than others, and poor conductors can reduce heat loss.
	<ul style="list-style-type: none"> discovers that when warmer things are put with cooler ones, the warm ones lose heat and the cool ones gain it until they are all the same temperature. A warmer object can warm a cooler one by contact or at a distance.
	<ul style="list-style-type: none"> experiences that heat energy moves from one place to another in three different ways: radiation, convection, and conduction.

TASK ANALYSIS

The student...

- identifies natural resources and their importance.
- classifies resources as renewable or nonrenewable.
- examines the risk factors associated with the use of nonrenewable energy sources.
- explains that the energy in fossil fuels, such as oil and coal, comes from the sun indirectly, the main source of energy for people, because the fuels come from plants that grew long ago.
- recognizes that the limited supply of usable energy sources (e.g., fuels such as coal or oil) places great significance on the development of renewable energy sources.
- explores the development of alternative energy sources (e.g., solar energy, winds, synthetic fuels, geothermal energy).
- develops a plan for energy conservation.

Subject Area: Science
Strand C: Force and Motion

Benchmarks

- SC.C.1.2.1: The student understands that the motion of an object can be described and measured.
- SC.C.2.2.1: The student recognizes that forces of gravity, magnetism, and electricity operate simple machines.
- SC.C.2.2.2: The student knows that an object may move in a straight line at a constant speed, speed up, slow down, or change direction dependent on net force acting on the object.

TASK ANALYSIS	
The student...	
SIMPLE MACHINES	
•	demonstrates that work is done every time a force is used to move something.
•	identifies the six types of simple machines (screw, inclined plane, wedge, pulley, lever, wheel and axle).
•	demonstrates how simple machines are used to accomplish work.
•	describes the motion of various objects (e.g., forward, circular, wave).
•	measures the distance traveled by various objects.
•	classifies the motion of an object as traveling in a straight line at a constant speed, speeding up, slowing down, or changing direction.
•	experiences that the greater the force, the greater the change in the motion of an object.

Subject Area: Science
Strand C: Force and Motion

Benchmarks

<p>SC.B.1.2.1: The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).</p> <p>SC.B.1.2.4: The student knows the many ways in which energy can be transformed from one type to another.</p> <p>SC.C.1.2.1: The student understands that the motion of an object can be described and measured.</p> <p>SC.C.1.2.2: The student knows that waves travel at different speeds through different materials.</p> <p>SC.C.2.2.2: The student knows that an object may move in a straight line at a constant speed, speed up, slow down, or change direction dependent on net force acting on the object.</p> <p>SC.C.2.2.3: The student knows that the more massive an object is, the less effect a given force has.</p> <p>SC.C.2.2.4: The student knows that the motion of an object is determined by the overall effect of all of the forces acting on the object.</p>

TASK ANALYSIS	
The student...	FORCE AND MOTION
•	identifies <i>force</i> as any push or pull (e.g., gravity, electricity, and magnetism) that causes objects to change their state of motion. The greater the force is, the greater the change in motion.
•	describes the motion of an object by its position, direction, and speed.
•	investigates to discover that the speed at which things move differs greatly. Some things are so slow that their journey takes a long time; others move too fast for people to ever see them.
•	uses scientific tools (e.g., stopwatch, meter stick) to measure the speed and distance traveled by an object and displays the data in a graphic representation.
•	traces the flow of energy as it is converted from one form to another (e.g., potential to kinetic) through a system.
•	discovers through activities that the more mass an object has, the more force it takes to change its state of motion.
•	demonstrates how inertia (an object's tendency to resist a change in motion), gravity, friction, and mass affect motion.
•	uses a Slinky, rope, or spring to demonstrate that one way energy is transported is through waves (oscillations - back and forth or up and down motions) that travel from one place to another.
•	understands that waves (e.g., sound, light) travel at different speeds through different materials.
•	draws and describes some characteristics of waves (e.g., crest [highest point], trough [lowest point], length).

Subject Area: Science
Strand D: Processes that Shape the Earth

Benchmarks

SC.D.1.2.1: The student knows that larger rocks can be broken down into smaller rocks, which in turn can be broken down to combine with organic material to form soil.

SC.D.1.2.4: The student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features.

SC.D.1.2.5: The student knows that some changes in the Earth's surface are due to slow processes and some changes are due to rapid processes.

TASK ANALYSIS	
The student...	
WEATHERING EARTH	
•	demonstrates that smaller rocks come from the breaking and weathering of bedrock and larger rocks.
•	observes that soil is made partly from weathered rock, partly from plant remains, and also contains many living organisms.
•	investigates how waves, wind, water, and ice shape and reshape the earth's surface by eroding rock and soil in some areas and depositing them in other areas to form new features.
•	experiences how some changes in the earth's surface are due to slow processes, such as erosion and weathering; and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.
•	observes and infers in order to classify rocks (igneous, sedimentary, metamorphic) according to the process by which they were formed.

Subject Area: Science
Strand D: Processes that Shape the Earth

Benchmarks

SC.D.1.2.2: The student knows that 75 percent of the surface of the Earth is covered by water.

SC.D.2.2.1: The student knows that reusing, recycling, and reducing the use of natural resources improve and protect the quality of life.

SC.G.2.2.3: The student understands that changes in the habitat of an organism may be beneficial or harmful.

TASK ANALYSIS	
The student...	
	OCEANS
	<ul style="list-style-type: none">discovers, through probability, that approximately 75 percent of the surface of the earth is covered by water.creates a graph to illustrate that less than one percent of the earth's water is fresh ground water and fresh water in lakes, rivers, and streams; two percent is fresh water frozen in glaciers and the polar ice caps; and 97 percent is salt water.appreciates the oceans as natural resources that provide many benefits.differentiates ways humans change environments as either beneficial or harmful to themselves and other organisms.

Subject Area: Science
Strand D: Processes that Shape the Earth

Benchmarks

SC.D.1.2.3: The student knows that the water cycle is influenced by temperature, pressure, and the topography of the land.

SC.D.2.2.1: The student knows that reusing, recycling, and reducing the use of natural resources improve and protect the quality of life.

TASK ANALYSIS	
The student...	
	THE WATER CYCLE
	<ul style="list-style-type: none">• simulates the water cycle.• explains the stages of the water cycle (evaporation, condensation, precipitation) to illustrate that when liquid water evaporates, it turns into a gas (vapor) in the air and condenses as a liquid when cooled, or as a solid if cooled below the freezing point of water.• compares the rate at which land and water heat and cool and relates this uneven heating to the weather.• demonstrates that air has pressure, which can be measured and affects weather.• creates a model of the Floridan Aquifer to illustrate how growth and development affect the water supply.• assesses how our lives are affected by the water cycle and creates a plan to conserve water.

Subject Area: Science
Strand E: Earth and Space

Benchmarks

<p>SC.E.1.2.1: The student knows that the tilt of the Earth on its own axis as it rotates and revolves around the Sun causes changes in season, length of day, and energy available.</p> <p>SC.E.1.2.2: The student knows that the combination of the Earth’s movement and the Moon’s own orbit around the Earth results in the appearance of cyclical phases of the Moon.</p> <p>SC.E.1.2.4: The student knows that the planets differ in size, characteristics, and composition and that they orbit the Sun in our Solar System.</p> <p>SC.E.1.2.5: The student understands the arrangement of planets in our Solar System.</p> <p>SC.E.2.2.1: The student knows that, in addition to the Sun, there are many other stars that are far away.</p>
--

TASK ANALYSIS	
The student...	
	SOLAR SYSTEM
	<ul style="list-style-type: none"> • uses a model to locate the relative positions of all the planets and the asteroid belt as they orbit the sun in our solar system. • identifies gravity as one of the forces that keeps planets arranged in orbits around the sun and the moon in orbit around the earth. • classifies the planets according to size, characteristics, and composition. • locates and describes the position of an object relative to another object or the background (e.g., the earth changes its position in relation to the sun). • identifies the sun as a medium-sized star located near the edge of our galaxy which also contains billions of other stars. • describes an object’s motion by tracing and measuring its position over time (e.g., the relationship of the sun’s position to the earth as the earth rotates during the course of a day). • simulates the rotation of the earth on its axis every 24 hours to produce the night and day cycle. • simulates the tilt of the earth on its axis and the revolution of the earth around the sun to demonstrate the cause for the changes in seasons, length of day, and the amount of energy available. • observes and records that days and nights change in length throughout the year. • relates the angle at which the rays of the sun strike the surface of the earth to the amount of energy received and thus the season of the year. • observes and records that the observable shape of the moon changes from day to day in a cycle that lasts approximately 28 days. • models and describes the relative positions of the moon, earth, and sun during each of the phases of the moon. • explains the cause of the phases of the moon.

Subject Area: Science
Strand F: Processes of Life

Benchmarks

SC.A.2.2.1: The student knows that materials may be made of parts too small to be seen without magnification.
SC.F.1.2.1: The student knows that the human body is made of systems with structures and functions that are related.
SC.F.1.2.3: The student knows that living things are different but share similar structures.
SC.F.1.2.4: The student knows that similar cells form different kinds of structures.

TASK ANALYSIS	
The student...	
	THE HUMAN BODY
	<ul style="list-style-type: none">• observes and studies minute details of objects using a variety of tools (hand lens, microscope).• uses a microscope to see that living things are made mostly of cells.• identifies the main parts of plant and animal cells.• explains that all organisms are composed of cells – the fundamental unit of life. Specialized cells perform specialized functions in multi-cellular organisms. Important levels of organization for structure and function include cells, tissues, organs, organ systems, whole organisms, and ecosystems.• knows that processes needed for life are carried out by the cells and that complex animals have specialized organs to carry out life processes.• uses a model to explain the functions of the major organ systems of the human body (e.g., digestive, respiratory, circulatory, skeletal, nervous, muscular, excretory).• collects personal health-related data (e.g., temperature, heart rate) with simple devices such as a watch, a thermometer, and a stethoscope, to get a sense of how such information varies.

Subject Area: Science
Strand G: How Living Things Interact with Their Environment

Benchmarks

SC.B.1.2.1: The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).

SC.B.2.2.1: The student knows that some source of energy is needed for organisms to stay alive and grow.

SC.F.1.2.2: The student knows how all animals depend on plants.

SC.G.1.2.1: The student knows ways that plants, animals, and protists interact.

SC.G.1.2.5: The student knows that animals eat plants or other animals to acquire the energy they need for survival.

SC.G.2.2.2: The student knows that the size of a population is dependent upon the available resources within its community.

SC.G.2.2.3: The student understands that changes in the habitat of an organism may be beneficial or harmful.

TASK ANALYSIS

The student...

INTERDEPENDENCE OF ORGANISMS AND THEIR ENVIRONMENT

- compares plants grown under various environmental conditions such as different temperatures, amounts of light, types of soil, etc.
- creates and analyzes food chains and food webs (sun, decomposers, producers, consumers, carnivores, herbivores, omnivores).
- experiences, through participation in simulations, that each habitat supports a limited population with the limit being set by the food, water, shelter, and space available.
- classifies and justifies changes in the habitat of an organism as beneficial or harmful.

Subject Area: Science
Strand G: How Living Things Interact with Their Environment

Benchmarks

<p>SC.F.1.2.3: The student knows that living things are different but share similar structures.</p> <p>SC.F.2.2.1: The student knows that many characteristics of an organism are inherited from the parents of the organism, but that other characteristics are learned from an individual’s interactions with the environment.</p> <p>SC.G.1.2.1: The student knows ways that plants, animals, and protists interact.</p> <p>SC.G.1.2.2: The student knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment.</p> <p>SC.G.2.2.1: The student knows that all living things must compete for Earth’s limited resources; organisms best adapted to compete for the available resources will be successful and pass their adaptations (traits) to their offspring.</p> <p>SC.G.2.2.3: The student understands that changes in the habitat of an organism may be beneficial or harmful.</p>
--

TASK ANALYSIS	
The student...	LIFE ADAPTATIONS
	<ul style="list-style-type: none"> recognizes that plants and animals share and compete for limited resources such as oxygen, water, food, and space.
	<ul style="list-style-type: none"> identifies, through activities, behavioral and structural adaptations that allow plants and animals to survive in an environment.
	<ul style="list-style-type: none"> observes that characteristics of an organism are inherited from the genetic ancestors of the organism (e.g., eye color, flower color).
	<ul style="list-style-type: none"> compares individuals of the same kind to see how they differ in their characteristics, and that sometimes the differences give individuals an advantage in surviving and reproducing.
	<ul style="list-style-type: none"> describes characteristics resulting from an organism’s interactions with the environment (e.g., flamingos eat a certain crustacean that causes their feathers to be pink).
	<ul style="list-style-type: none"> discovers, through simulations, how changes in the environment affect organisms (e.g., some organisms move in, others move out; some organisms survive and reproduce, others die).
	<ul style="list-style-type: none"> identifies fossils as tools scientists use to better understand the adaptations of organisms.

Subject Area: Science
Strand G: How Living Things Interact with Their Environment

Benchmarks

SC.B.1.2.1: The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).
SC.B.2.2.1: The student knows that some source of energy is needed for organisms to stay alive and grow.
SC.F.1.2.2: The student knows how all animals depend on plants.
SC.G.1.2.1: The student knows ways that plants, animals, and protists interact.
SC.G.1.2.3: The student knows that green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction.
SC.G.1.2.4: The student knows that some organisms decompose dead plants and animals into simple minerals and nutrients for use by living things and thereby recycle matter.
SC.G.1.2.5: The student knows that animals eat plants or other animals to acquire the energy they need for survival.
SC.G.1.2.6: The student knows that organisms are growing, dying, and decaying and that new organisms are being produced from the materials of dead organisms.
SC.G.1.2.7: The student knows that variations in light, water, temperature, and soil content are largely responsible for the existence of different kinds of organisms and population densities in an ecosystem.
SC.G.2.2.3: The student understands that changes in the habitat of an organism may be beneficial or harmful.

TASK ANALYSIS	
The student...	ECOSYSTEMS
	<ul style="list-style-type: none"> organizes important levels for structure and function to include cells, organs, tissues, organ systems, whole organisms, and ecosystems.
	<ul style="list-style-type: none"> describes an ecosystem as a community of living and nonliving organisms and their immediate surroundings (e.g., air, rocks, soil) driven by the sun's energy.
	<ul style="list-style-type: none"> explores how the existence of different kinds of organisms and population densities in an ecosystem depends on variations in light, water, air, and soil content.
	<ul style="list-style-type: none"> determines that for any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.
	<ul style="list-style-type: none"> recognizes that some source of energy is needed for all organisms to stay alive and grow.
	<ul style="list-style-type: none"> identifies the major source of energy of ecosystems as sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism to organism in food webs.
	<ul style="list-style-type: none"> explains how green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction.
	<ul style="list-style-type: none"> categorizes populations of organisms by the function they serve in an ecosystem: plants and some microorganisms as <i>producers</i> that make their own food; animals, including humans, as <i>consumers</i>, which obtain food by eating other organisms; and <i>decomposers</i>, primarily bacteria and fungi, recyclers that break down dead plant and animal materials into elements that return to the soil, water, and air for use again.
	<ul style="list-style-type: none"> examines patterns of interdependency in ecological systems by analyzing relationships in food webs among producers, consumers, and decomposers and discovers that no matter how distant the relationship may seem, all things are connected.

TASK ANALYSIS

The student...

- infers that changes (e.g., natural hazards, such as earthquakes, landslides, wildfires, volcanic eruptions, floods, storms) in an ecological system usually affect the whole system, because one part of the environment cannot be altered without affecting the others.
- classifies changes in an ecosystem as either beneficial or harmful to specified organisms.
- values humans as part of the web of life, in which everything is connected and recognizes the need to live in ways that respect the interconnectedness of all things.