

A Correlation of Science and Technology for Children® and Science and Technology Concepts for Middle Schools™ to the Grade Level Expectations for the Sunshine State Standards for Science

Prepared by Carolina Biological Supply Company

This document gives a quick visual guide to the alignment of Science and Technology for Children® (STC®) and Science and Technology Concepts for Middle Schools™ (STC/MS™) units with the Grade Level Expectations for the Sunshine State Standards for Science. Although each STC and STC/MS unit was developed for use at a specific grade level, there is some flexibility in grade placement — any unit may be used a grade above or below the one for which it was developed. Because of this flexibility, many curriculum planners prefer to think of each unit as covering a three-level band of grades (as indicated in the chart below). In addition, STC/MS units can be used at grade 9 as well.

All fourth-grade through sixth-grade STC unit kits include a Discovery Deck, a set of extensions for the unit. When a Discovery Deck meets or helps to meet a standard, the abbreviation DD will follow the unit abbreviation.

STC® and STC/MS™ Recommended Grade Levels and Unit Abbreviations

The National Science Resources Center (NSRC), developer of the STC and STC/MS programs, recommends the units be used within the following grade ranges.

	Grades	Life and Earth Science		Physical Science and Technology	
STC	K–2	<i>Organisms</i> (O)	<i>Weather</i> (W)	<i>Solids and Liquids</i> (SL)	<i>Comparing and Measuring</i> (CM)
	1–3	<i>The Life Cycle of Butterflies</i> (LCB)	<i>Soils</i> (S)	<i>Changes</i> (C)	<i>Balancing and Weighing</i> (BW)
	2–4	<i>Plant Growth and Development</i> (PGD)	<i>Rocks and Minerals</i> (RM)	<i>Chemical Tests</i> (CT)	<i>Sound</i> (So)
	3–5	<i>Animal Studies*</i> (AS)	<i>Land and Water*</i> (LW)	<i>Electric Circuits*</i> (EC)	<i>Motion and Design*</i> (MD)
	4–6	<i>Microworlds*</i> (Mw)	<i>Ecosystems*</i> (E)	<i>Food Chemistry*</i> (FC)	<i>Floating and Sinking*</i> (FS)
	5–7	<i>Experiments with Plants*</i> (EP)	<i>Measuring Time*</i> (MT)	<i>Magnets and Motors*</i> (MM)	<i>The Technology of Paper*</i> (TP)
STC/MS	6–8**	<i>Human Body Systems</i> (HBS)	<i>Catastrophic Events</i> (CE)	<i>Properties of Matter</i> (POM)	<i>Energy, Machines, and Motion</i> (EMM)
		<i>Organisms—From Macro to Micro</i> (OMM)	<i>Earth in Space</i> (ES)	<i>Light</i> (L)	<i>Electrical Energy and Circuit Design</i> (EECD)

*Unit kit includes a Discovery Deck (DD).

**STC/MS units may also be used at grade 9.

V0309

Kindergarten	
Grade Level Expectation	STC Unit(s)
The Nature of Matter	
knows that objects have many different observable properties:	
color	O, W, SL
shapes (circle, triangle, square)	O, W, SL
forms (flexible, stiff, straight, curved)	
textures (rough, smooth, hard, soft)	O, SL
sizes and weights (big, little, large, small, heavy, light, wide, thin, long, short)	O, W, CM
positions and speeds (over, under, in, out, above, below, left, right, fast, slow)	SL, CM
knows that matter exists in different states (solid, liquid, gas).	W, SL
knows that materials can be changed by cutting, folding, bending, and mixing.	SL
knows that some objects are made up of many different materials.	SL, CM
Energy	
knows the effects of sun and shade on the same object (for example, crayons, ice, chocolate).	W
knows that light can pass through some objects, but cannot pass through other objects.	O, W, SL
understands that a terrarium or an aquarium is a model of a system.	O
knows some processes where heat can be released (for example, playing a radio, burning a candle).	
understands that people eat food to survive.	
Force and Motion	
understands that different things move at different speeds (bicycle/motorcycle, car/plane, tortoise/hare).	O, W, SL
knows the names of objects that roll, slide, or fly.	O, SL
knows that the motion of an object (for example, toy truck, toy car, ball, marble) can be changed by a push or a pull.	W, SL, CM
knows that vibrations caused by sound waves can be felt (for example, on a speaker when music is played, the head of a drum when it is hit, or a tuning fork).	
Processes that Shape the Earth	
knows that the surface of the Earth is composed of different types of solid materials (for example, sand, pebbles, rocks, clumps of dirt).	
knows that life occurs on or near the surface of the Earth in land, water, and air.	O
uses charts to display daily changes in the weather.	W
knows ways to care for the Earth at home and in school (for example, limiting use of paper towels, turning off water while brushing teeth, turning off lights when no one will be in the room).	
Earth and Space	

knows that the sky looks different during the day than it does at night.	
knows that the position of the Sun in the sky appears to change during the day.	
knows some of the objects seen in the night sky (for example, stars, Moon).	
Processes of Life	
knows some of the basic needs of living things (for example, food, water, space).	O
knows ways living things change and grow over time (for example, seed to flowering plant, tadpole to frog).	O
knows that plants and animals are found in different kinds of environments and are often hidden.	O
knows selected characteristics of plants and animals (for example, shape, size, color).	O
knows names for animal offspring (for example, puppies, kittens, cubs, calves, chicks, children).	
Knows that plants and animals may live in different habitats.	O
How Living Things Interact with Their Environment	
understands ways that animals obtain food from plants and other animals.	O
knows that if living things do not get food, water, shelter, and space, they will die.	O
The Nature of Science	
knows that learning can come from careful observation.	All STC units
repeats events several times and compares the findings.	W, SL
works with a partner or small group to collect information.	All STC units
shares findings about scientific investigations with others.	All STC units
poses questions, seeks answers, draws pictures of observations, and makes decisions using information.	All STC units
knows that the five senses (taste, touch, smell, hearing, sight) allow us to take in and respond to information in order to learn about our surroundings.	O, W, SL, CM (The sense of taste is never used in STC units.)
understands that continuous patterns occur in nature (for example, seasons, phases of the Moon, blooming flowers).	O, W
knows some appropriate tools for collecting information and extending the senses.	W, SL, CM
First Grade	
Grade Level Expectation	STC Unit(s)
The Nature of Matter	
knows that objects can be grouped according to their physical characteristics (for example, shape, color, texture, form, size).	W, SL, CM, S, C, BW
knows the effects of heating and cooling on solids, liquids, and gases.	C
knows the physical properties of ice, water, and steam.	SL, C
knows that objects are composed of parts that are too small to be seen without magnification (for example, rocks, cookies, string, paper).	S
Energy	
knows that heat from the Sun has varying effects depending on the surface it strikes.	W

predicts which materials will allow light to pass through and which ones will not.	W, SL, C
understands that models (for example, terrarium or aquarium) can be used to observe processes and changes over time.	O, W, LCB, C
knows ways that human activities require and release energy.	
understands that people need food for energy.	
knows nutritional value of various foods (for example, fruit, cereals, dairy, meat).	
Force and Motion	
knows the relative order of speeds of various objects (for example, snails, turtles, tricycles, bicycles, cars, jets, rockets).	
knows that various things move at different speeds when different forces are applied.	O, W, SL, LCB, C, BW
understands various ways gravity affects the motion of objects (for example, an object on a ramp, an object that is dropped).	
knows that vibrations of objects (for example, strings, drumheads, rubber bands) cause sounds.	
Processes that Shape the Earth	
extends and refines knowledge that the surface of the Earth is composed of different types of solid materials.	S
knows some kinds of organisms that live on or near the surface of the Earth in land, water, and air.	O, LCB, S
uses graphic organizers to display weather data and show weather patterns.	W
extends and refines knowledge of ways to care for the Earth at home and in school.	S
Earth and Space	
knows that the amount of light reflected by the Moon is a little different every day, but the Moon appears the same again about every 28 days.	
knows that night and day are caused by the rotation of the Earth.	
knows and differentiates objects seen in the day and night sky (for example, clouds, Sun, stars, Moon, planets).	
Processes of Life	
understands that living things need food, water, space, and shelter to survive.	O, LCB, S
knows how to classify things as living and nonliving.	O, LCB, S
knows ways organisms change as they grow and mature (for example, as people grow up their size changes).	O, LCB, S
knows that living things grow and change in different ways and in different lengths of time (for example, butterfly, frog, daisy, pine tree).	O, LCB
knows that plants and animals have adaptations that help them survive in their environment (camouflage, teeth, spines).	O, LCB
understands different ways in which living things can be grouped (for example, plants/animals, edible plants/non-edible plants).	O, LCB
knows that plants and animals are similar but not identical to their parents.	O, LCB
knows plants and animals that live in a particular habitat (for example, black bears in the forest, whales in the ocean, camels in the desert, ducks in the wetlands).	O

knows the characteristics of the climate in different habitats (for example, sunlight, moisture, temperature).	O
knows some ways in which animals and plants are adapted to living in different environments.	O, LCB, S
How Living Things Interact with Their Environment	
knows that environments have living and nonliving parts.	O, LCB, S
knows that plants produce oxygen and food for animals.	O, LCB, S
understands that animals can be grouped according to what they eat.	
understands that living things are part of a food chain.	
knows some characteristics of different environments and some plants and animals found there.	O, S
understands why living things must have food, water, shelter, and space to survive.	O, LCB, S
understands that there are limited resources available for all living things to use.	
The Nature of Science	
knows that scientific investigations generally work the same way in different places.	All STC units
understands the importance of accuracy and repetition in conducting scientific inquiries.	W, SL, S, C, BW
works with others to complete an experiment or to solve a problem.	All STC units
listens, records, and compares the ideas and observations of others.	All STC units
uses simple graphs, pictures, written statements, and numbers to observe, describe, record, and compare data.	All STC units
uses a variety of tools (for example, thermometers, magnifiers, rulers, scales, computers) to identify characteristics of objects.	O, W, SL, CM, LCB, S, C, BW
uses standard (for example, centimeters) and nonstandard units (for example, paper clips, hands, pencils) to measure organisms and objects and parts of organisms and objects.	O, CM, BW
uses information gathered to identify patterns in nature to make predictions (for example, shapes of leaves, petals on flowers, rings on seashells).	O, W, LCB, S, C
knows that scientists and technologists use a variety of tools (e.g., thermometers, magnifiers, rulers, and scales) to obtain information in more detail and to make work easier.	W, SL, CM, LCB, S, C, BW
Second Grade	
Grade Level Expectation	STC Unit(s)
The Nature of Matter	
knows ways objects can be grouped according to similarities or differences of their physical characteristics.	S, C, BW, RM, CT
knows examples of solids, liquids, and gases.	W, SL, C
knows the observable properties of solids, liquids, and gases.	W, SL, C
knows that not all objects or materials respond to change in the same way (for example, a plastic object in the freezer compared with water in a freezer).	C
knows that common objects are composed of parts that are too small to be seen without magnification (for example, hair, cloth, paper).	S, RM

knows that a variety of tools can be used to examine objects at differing degrees of magnification (for example, a hand lens, layered hand lenses, a microscope).	O, SL, LCB, S, C, PGD, RM, CT
Energy	
knows that a thermometer measures the amount of heat absorbed by an object.	W
understands that some materials will allow light to pass and others will not.	O, W, SL, C, RM
understands that models (for example, terrarium or aquarium) can be used to illustrate how energy flows through a system.	O, LCB
knows how model energy systems change throughout the year (for example, collecting data and recording changes in a terrarium or aquarium that models an energy system).	O, LCB
knows different heat sources (for example, friction, solar, nuclear, electric).	W, C, CT
uses graphic organizers to classify food groups.	
understands the relationship of food to the need for energy for daily activities.	O, LCB, S, PGD
understands ways energy and matter interact (for example, sunlight to affect plant growth, heat to boil water).	O, W, LCB, S, C, PGD, CT, So
Force and Motion	
knows that objects exhibit different kinds of motion (for example, straight, circular, back and forth).	O, W, SL, CM, LCB, BW, So
knows that the amount and direction of the force exerted on an object (for example, push, pull, friction, gravity) determines how much the object will move.	W, SL, CM, BW, So
knows that objects may be moved by being pushed and pulled with magnets.	SL
compares the amount of pushing and pulling required to move objects of various sizes across the floor.	SL
demonstrates that some vibrations may be heard.	So
understands that sound travels differently through different media (for example, wood, water, air).	So
knows that properties of sound such as pitch and loudness can be altered by changing the properties of the sound source.	So
Processes that Shape the Earth	
extends and refines knowledge that the surface of the Earth is composed of different types of solid materials that come in all sizes.	S, RM
compares the characteristics of things that live on land, in the water, and in the air.	O, LCB, S, PGD (air not included)
knows that some organisms have adaptations that enable them to move from one medium to another (for example, dragonflies begin life in water, move to land, and then fly in the air).	LCB
knows that weather conditions occur in patterns over time.	W
knows ways that human activity affects the environment (for example, landfills for disposal of wastes, land development for homes and industry, dams to control rivers or generate electricity).	S
Earth and Space	

knows that the Moon moves around the Earth, the Earth moves around the Sun, and the Moon is visible when it reflects the light from the Sun.	
knows that each time the Earth completes one rotation, one day has passed and that this takes 24 hours.	
knows that stars and planets are always in the sky.	
Processes of Life	
understands that the amount of food, water, space, and shelter needed is dependent on the size and kind of living thing.	O, LCB, S, PGD
understands that living things can reproduce, and nonliving things cannot reproduce.	O, LCB, S, PGD
knows some factors that influence the growth of living things (for example, amount of water, amount of light, amount and type of food, type of soil).	O, LCB, S, PGD
understands that structures of living things are adapted to their function in specific environments.	O, LCB, S, PGD
knows some characteristics of the vertebrate groups (mammals, reptiles, birds, amphibians, fish).	O, LCB
knows the main parts of plants (stems, leaves, roots, flowers).	O, PGD
knows that the structural characteristics of plants and animals are used to group them.	O, LCB, PGD
understands that plants and animals produce offspring with similar characteristics, but individual differences (for example, kittens in a litter may be colored differently).	O, LCB
knows that plants and animals are adapted to different ranges of temperature and moisture.	O, LCB, PGD
How Living Things Interact with Their Environment	
understands that there is an interdependency of plants and animals that can be shown in a food web.	
understands that living organisms need to be adapted to their environment to survive.	O, LCB, S, PGD
knows that animals and plants can be associated with their environment by an examination of their structural characteristics (for example, physical structures are adaptations that allow plants and animals to survive, such as gills in fish, lungs in mammals).	O, LCB, S, PGD
knows selected resources used by people for water, food, and shelter are limited and necessary for their survival.	S
knows that human beings cause changes in their environment, and these changes can be positive (for example, creating refuges, replanting deforested regions, creating laws to restrict burning) or negative (for example, introducing exotic organisms, deforestation, littering, contaminating water and air).	LCB, S, PGD
The Nature of Science	
knows the difference between verified observation and personal interpretation.	
knows that when tests are repeated under the same condition, similar results are usually obtained.	W, SL, S, C, BW, PGD, RM, CT, So
participates in groups to conduct experiments and solve problems.	All STC units
understands that one can gain confidence in scientific methods by comparing and verifying scientific results with others.	All STC units

understands that, through the use of science processes, people can solve problems and make decisions.	All STC units
analyzes information to make predictions, makes sketches and diagrams to explain ideas, draws conclusions using information and prior knowledge.	All STC units
keeps science records.	All STC units
uses a variety of tools to observe, measure, analyze, and predict changes in size, mass, temperature, color, position, quantity, sound, and movement.	O, W, SL, CM, LCB, S, C, BW, PGD, RM, CT, So
uses metric and standard English units to measure distance, volume, mass, and temperature.	W, PGD, CT, So
knows how to sort organisms, objects, and events based on patterns.	W, SL, LCB, S, C, BW, PGD, RM, CT, So
knows ways in which tools are used by scientists (for example, to gather information, to analyze, to calculate).	W, SL, CM, LCB, S, C, BW, PGD, RM, CT, So
Third Grade	
Grade Level Expectation	STC Unit(s)
The Nature of Matter	
determines the physical properties of matter using metric measurements that incorporate tools such as rulers, thermometers, balances.	BW, RM, CT, So, LW, MD
understands that physical changes in the states of matter can be produced by heating and cooling.	C, LW
knows that the weight of an object is equal to the sum of the weights of its parts.	BW
uses a tool to observe and study minute details of objects (for example, hand lens).	S, C, RM, CT
Energy	
knows objects that emit heat and light.	C, PGD, CT, EC, EC DD, MD
knows different forms of energy (for example, heat, light, sound).	C, PGD, CT, So, AS, LW, EC, EC DD, MD
knows that the Sun provides energy for the Earth in the form of heat and light.	PGD, AS, LW, EC DD
knows that heat can be produced by chemical reactions, electrical machines, and friction.	C, EC, EC DD
uses a variety of tools to measure the gain or loss of energy.	
knows that when a warmer object comes in contact with a cooler one, the warm object loses heat and the cool one gains it until they are both at the same temperature.	
knows that some source of energy is needed for organisms to stay alive and grow.	LCB, S, PGD, AS
knows ways natural resources are important.	S, RM, LW, LW DD
classifies resources as renewable or nonrenewable.	
knows that alternate energy sources (for example, synthetic fuels, geothermal energy) are being explored using natural and mechanical processes.	
Force and Motion	
describes the motion of various objects (for example, forward, circular, wave).	So, LW, MD, MD DD
understands the characteristics of waves (for example, crest, trough, length).	

knows the six types of simple machines (screw, inclined plane, wedge, pulley, lever, and wheel and axle).	So (screw only), MD (wheel and axle only), MD DD
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.	LW, MD, MD DD
Processes that Shape the Earth	
knows that smaller rocks come from the breaking and weathering of bedrock and larger rocks.	S, RM, LW
knows that approximately 75 percent of the surface of the Earth is covered by water.	LW
understands the stages of the water cycle (for example, evaporation, condensation, precipitation).	LW, LW DD
understands the processes of weathering and erosion.	RM, LW, LW DD
knows that land forms change over time (for example, earthquakes, volcanoes).	RM, LW, LW DD
knows that reusing, recycling, and reducing the use of natural resources improve and protect the quality of life.	S, LW
Earth and Space	
knows that days and nights change in length throughout the year.	
knows the patterns of average temperatures throughout the year.	
knows the frequency of the lunar cycle is approximately 28 days.	
knows the Sun is a star that is much nearer to the Earth than the other stars.	
knows characteristics of Mercury, Venus, Earth, and Mars.	
knows the relative positions of all the planets.	
knows that, in addition to the Sun, there are many other stars that are far away.	
Processes of Life	
understands the various ways that animals depend on plants for survival (for example, food, shelter, oxygen).	LCB, S, AS
knows the common and distinguishing characteristics of groups of vertebrate animals (mammals, birds, fish, reptiles, amphibians).	LCB, AS, AS DD
understands similarities and differences among plants.	PGD
understands that although plants and animals are different, they also share common characteristics (for example, they both have structures for reproduction, respiration, and growth).	LCB, PGD, AS, AS DD
How Living Things Interact with Their Environment	
knows how organisms with similar needs in a climatic region compete with one another for resources such as food, water, oxygen, or space.	PGD, AS
knows behavioral and structural adaptations that allow plants and animals to survive in an environment.	PGD, AS, AS DD
understands that energy is transferred to living organisms through the food they eat.	LCB, S, AS
knows examples of living things that are classified as producers, consumers, carnivores, herbivores, and omnivores.	
understands that plants and animals share and compete for limited resources such as oxygen, water, food, and space.	S, PGD, AS
knows that the size of a population is dependent upon the available resources within its community.	PGD, AS
The Nature of Science	

knows that it is important to keep accurate records and descriptions to provide information and clues on causes of discrepancies in repeated experiments.	All STC units
plans and investigates an experiment that defines a problem, proposes a solution, identifies variables, collects and organizes data, interprets data in tables, charts and graphs, analyzes information, makes predictions, and presents and supports findings.	All STC units
uses various kinds of instruments to collect and analyze information (for example, meter sticks, timing devices, graduated cylinders, force meters, pan balances, calipers, microscopes, cameras, sound recorders, hot plates, magnets, collecting nets).	S, BW, PGD, RM, CT, So, LW, MD
knows that to work collaboratively, all team members should be free to reach, explain, and justify their own individual conclusions.	All STC units
knows that to compare and contrast observations and results is an essential skill in science.	All STC units
uses sketches, diagrams, and models to understand scientific ideas.	All STC units
makes predictions and inferences based on observations.	All STC units
uses charts and graphs to understand patterns of change.	S, C, PGD, CT, So, LW, MD
understands the relationships between science concepts and the history of science and the contributions of scientists.	LCB, PGD, RM, LW, EC, MD
uses reference materials to obtain information related to science concepts.	All STC units and Discovery Decks
knows that data are collected and interpreted in order to explain an event or concept.	All STC units
understands that scientific information can be presented in several ways (for example, using numbers and mathematics, drawings, words, graphs, tables).	All STC units and Discovery Decks
understands how scientific discoveries have helped or hindered progress regarding human health and lifestyles.	RM, CT, LW, EC, MD
knows that, through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas.	S, C, BW, PGD, RM, CT, So, AS, LW, EC, MD
Fourth Grade	
Grade Level Expectations	STC Unit(s)
The Nature of Matter	
uses a variety of measurements to compare and contrast the physical properties of matter.	RM, CT, So, LW, MD, Mw, E, FC, FS
understands that heating or cooling of matter will speed up or slow down, respectively, the motion of the small particles within matter and that this is what causes a phase change.	
uses a variety of tools (hand lens, microscope) to observe and study minute details of objects.	RM, CT, Mw, FC
Energy	
knows that most living things use energy from the Sun to live and grow.	PGD, AS, Mw, E, FC
knows how to trace the flow of energy in a system (for example, in an ecosystem).	PGD, CT, So, AS, LW, EC, EC DD, MD, MD DD, Mw, E, E DD, FC, FC DD

knows that there are a variety of sources for electricity (for example, hydroelectric, geothermal, windmills).	LW, EC, EC DD
knows the relationship between attributes of all waves (for example, wavelength, frequency) and attributes of sound waves (for example, pitch, intensity).	So (attributes of sound waves only)
knows that most objects that emit light also emit heat.	PGD, CT, EC, EC DD, MD
knows ways that energy can be transformed (for example, electricity to light, light to heat, mechanical to heat).	PGD, CT, So, LW, EC, EC DD, E, FC, FC DD
knows that moving electric charges produce magnetic forces and moving magnets produce electric currents.	EC
extends and refines use of a variety of tools to measure the gain or loss of energy.	
understands the reasons for energy conservation.	EC, EC DD
knows the risk factors associated with the use of nonrenewable energy sources (for example, economic factors and health factors).	PGD, RM, AS, E, E DD
understands the processes that created fossil fuels and why they are nonrenewable.	
Force and Motion	
knows that velocity describes a change in distance over time.	
understands that waves behave differently in different media (for example, water, a wall, the atmosphere, a vacuum).	So
understands how simple machines are used to make tasks possible.	So, MD, MD DD
uses tools to measure changes in position, direction, and speed of an object after a push or pull has been applied.	MD
Processes that Shape the Earth	
understands the stages of the rock cycle.	RM, LW
knows the properties of different types of soil.	LW
understands how the water cycle is influenced by temperature and land features.	LW
understands how processes of weathering and erosion constantly change the surface of the Earth.	LW, LW DD
knows ways in which people can conserve natural resources.	LW, E, E DD
knows ways misuse of natural resources affects the quality of life for all species.	AS DD, LW, E, E DD
Earth and Space	
knows that the tilt of the Earth causes the change of seasons, length of day, and the amount of energy available.	
understands the cause of the phases of the Moon (for example, the movement patterns of the Earth and Moon relative to the Sun).	
knows how the energy of the Sun can be captured as a source of heat and light on Earth (for example, plants, solar panels).	Mw, Mw DD, E
knows characteristics of Jupiter, Saturn, Uranus, Neptune, and Pluto.	
knows that gravity is the one of the forces that keeps planets arranged in orbits around the Sun and the Moon in orbit around the Earth.	

understands that the Sun is a medium-sized star located near the edge of a galaxy containing billions of other stars, which in turn is one of innumerable galaxies in the Universe.	
Processes of Life	
knows that complex animals have specialized organs to carry out life processes.	AS, AS DD, E
knows the major organ systems of the human body.	
understands the functions of various body systems.	
knows that living things are composed of cells.	Mw
knows that processes needed for life are carried out by the cells.	Mw
How Living Things Interact with Their Environment	
knows how plants and animals interact with one another in an ecosystem (for example, organization of communities, flow of energy through food webs).	E, E DD
understands the relationship among organisms in aquatic and terrestrial food chains (for example, the role of producers, consumers, and decomposers).	E
knows organisms that act as decomposers.	Mw, Mw DD, E
understands the need for nutrients and minerals for living organisms.	PGD, AS, Mw DD, E, E DD
understands the process of decay (for example, the stages of decay, the organisms that help the decay process, the nonliving factors that influence the rate of decay, the products of decay).	
knows that organisms are growing, dying, and decaying and that new organisms are being produced.	PGD, AS, AS DD, Mw, Mw DD, E, E DD
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.	AS, AS DD, Mw DD, E
knows the kinds of organisms that lived in the past and compares them to existing species.	
knows characteristics that allow members within a species to survive and reproduce.	PGD, AS, AS DD, E, E DD
understands patterns of interdependency in ecological systems.	E, E DD
understands that what benefits one organism may be harmful to other organisms.	PGD, AS, E, E DD
understands that changes in an ecological system usually affect the whole system.	E, E DD
The Nature of Science	
knows that scientists make the results of their investigations public, and they describe the investigations in ways that enable others to repeat the investigation.	PGD, RM, AS, EC, MD, Mw, E, FC, FS
plans and investigates experiments in which hypotheses are formulated based on cause and effect relationships; distinctions are made among observations, conclusions/inferences and predictions; a limited number of variables are controlled; and numerical data that are contradictory or unusual in experimental results are recognized.	E, FC, FS
uses metric tools to measure, record, and interpret data.	PGD, So, LW, MD, Mw, FS
works collaboratively to collect, share, and record information for a scientific investigation.	All STC units

knows that comparisons between experiments can be made when conditions are the same.	Compatible with all STC units
knows that a model of something is different from the real thing, but can be used to learn something about the real thing.	PGD, So, AS, LW, EC, MD, E, FS
makes predictions based on data from picture graphs, bar graphs, and line graphs.	PGD, MD, FS
knows basic patterns, sequences, and cycles occurring in nature.	PGD, RM, AS, LW, LW DD, E, E DD
knows that technologies often have costs, as well as benefits, and can have an enormous effect on people and other living things.	So, LW, EC, EC DD, MD, MD DD, E, E DD, FS, FS DD
researches and reports on a science topic.	Compatible with all STC units.
constructs and analyzes graphs, tables, maps, and charts to organize, examine, and evaluate information.	All STC units
uses criteria to understand and analyze the impact of scientific discoveries (for example, determines whether or not scientific claims are backed by sufficient evidence and logical arguments).	Compatible with all STC units
knows ways that, through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas.	PGD, RM, CT, So, AS, LW, EC, MD, Mw, E, FC, FS, all Discovery Decks
Fifth Grade	
Grade Level Expectation	STC Unit(s)
The Nature of Matter	
uses metric tools to determine the density and volume of materials.	FS, MT
knows that matter is conserved during heating and cooling.	
knows that different materials can be physically combined to produce different substances.	LW, EC, MD, Mw, E, FC, FS, MT, MM, TP
knows the differences and similarities between mixtures and solutions.	
knows that materials made by chemically combining two or more substances have properties that differ from the original materials.	FC
knows the difference between physical and chemical changes.	FC
knows that materials may be made of parts too small to be seen without magnification.	Mw, FC
Energy	
knows how to trace the flow of energy in a system (for example, electricity in a circuit to produce heat, light, sound, or magnetic fields).	AS, LW, EC, EC DD, MD, MD DD, Mw, E, E DD, FC, FC DD, EP, MT, MT DD, MM, MM DD
knows that energy can be described as stored energy (potential) or energy of motion (kinetic).	MD
extends and refines use of a variety of tools to measure the gain or loss of energy.	
knows that some materials conduct heat better than others.	
understands that convection, radiation, and conduction are methods of heat transfer.	
knows that the limited supply of usable energy sources (for example, fuels such as coal or oil) places great significance on the development of renewable energy sources.	LW, LW DD, E
Force and Motion	

uses scientific tools (for example, stopwatch, meter stick, compass) to measure speed, distance, and direction of an object.	MD, MT
knows that waves travel at different speeds through different materials.	
understands the relationship between force and distance as it relates to simple machines (for example, levers and fulcrums working to lift objects).	MD, MD DD
knows that objects do not change their motion unless acted upon by an outside force.	MD, MD DD, MT, MM
understands how friction affects an object in motion.	MD, MD DD
knows the relationship between the strength of a force and its effect on an object (for example, the greater the force, the greater the change in motion; the more massive the object, the smaller the effect of a given force).	MD, MD DD, MT, MM
knows that motion in space is different from motion on Earth due to changes in gravitational force and friction.	MD
understands how inertia, gravity, friction, mass, and force affect motion.	MD, MD DD, MT
Processes that Shape the Earth	
knows that rocks are constantly being formed and worn away.	LW, LW DD
understands how atmospheric pressure affects the water cycle.	
understands how eroded materials are transported and deposited over time in new areas to form new features (for example, deltas, beaches, dunes).	LW
understands that geological features result from the movement of the crust of the Earth (for example, mountains, volcanic islands).	LW, LW DD
understands how the surface of the Earth is shaped by both slow processes (for example, weathering, erosion, deposition) and rapid, cataclysmic events (for example, earthquakes, tsunamis, volcanoes).	LW, LW DD
extends and refines knowledge of ways people can reuse, recycle, and reduce the use of resources to improve and protect the quality of life.	LW, LW DD, E, E DD, TP, TP DD
Earth and Space	
knows the orbit of the Earth is slightly elliptical and the Earth is closest to the Sun in the Northern Hemisphere in winter.	
knows that the angle that the rays of the Sun strike the surface of the Earth determines the amount of energy received and thus the season of the year.	
knows the effect of the tilt of the Earth on polar climates.	
knows the relative positions of the Moon, Earth, and Sun during each of the phases of the Moon.	MT
knows that the planets differ in size, characteristics, and composition and that they orbit the Sun in our Solar System.	
knows the arrangement of the planets and the asteroid belt in our Solar System.	
Processes of Life	
understands how body systems interact (for example, how bones and muscles work together for movement).	
uses magnifying tools to identify similar cells and different kinds of structures.	Mw

knows the parts of plants and animal cells.	Mw
understands how similar cells are organized to form structures (for example, tissue, organs) in plants and animals.	Mw
knows that many characteristics of an organism are inherited from the genetic ancestors of the organism (for example, eye color, flower color).	AS, AS DD, Mw, E, EP, EP DD
knows that some characteristics result from the organism's interactions with the environment (for example, flamingos eat a certain crustacean that causes their feathers to be pink).	AS, AS DD, Mw
How Living Things Interact with Their Environment	
understands the various roles of single-celled organisms in the environment.	Mw, Mw DD
knows ways in which protists interact with plants and animals in the environment.	Mw, Mw DD
understands how changes in the environment affect organisms (for example, some organisms move in, others move out; some organisms survive and reproduce, others die).	AS, AS DD, Mw, Mw DD, E, E DD, EP, EP DD
knows that green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction.	E, EP
knows that adaptations to their environment may increase the survival of a species.	AS, AS DD, E, E DD, EP
The Nature of Science	
understands that although the same scientific investigation may give slightly different results when it is carried out by different persons or at different times or places, the general evidence collected from the investigation should be replicable by others.	
understands that scientists use different kinds of investigations (for example, observations of events in nature, controlled experiments) depending on the questions they are trying to answer.	All STC units
understands the importance of accuracy in conducting measurements, and uses estimation when exact measurements are not possible.	All STC units
understands the importance of communication among scientists (for example, informing and becoming informed about scientific investigations in progress and the work of others; exposing ideas to the criticism of others).	All STC units
uses strategies to review, compare and contrast, and critique scientific investigations.	All STC units
knows that an experiment must be repeated many times and yield consistent results before the results are accepted.	Compatible with all STC units
uses sketches and diagrams to propose scientific solutions to problems.	LW, EC, MD, MT
constructs models to compare objects in science.	AS, LW, EC, MD, E, FS, EP, MM, MT
makes a prediction for a new investigation using the data from a previous investigation.	AS, LW, EC, MD, Mw, E, FC, FS, EP, MT, MM, TP
understands that change is constantly occurring and uses strategies to analyze different patterns of change.	AS, LW, EC, MD, Mw, E, FS, EP, MT, MM

knows areas in which technology has improved human lives (for example, transportation, communication, nutrition, sanitation, health care, entertainment).	LW, LW DD, EC, EC DD, MD, MD DD, Mw, Mw DD, E, E DD, FC, FC DD, FS, FS DD, MT, MT DD, MM, MM DD, TP, TP DD
knows that new inventions often lead to other new inventions and ways of doing things.	MD, MD DD, Mw, Mw DD, MT, MT DD, MM, MM DD, TP DD
selects appropriate graphical representations (for example, graphs, charts, diagrams) to collect, record, and report data.	EP, MT
understands how a solution to one scientific problem can create another problem.	AS, LW, EC, MD, Mw, E, FC, EP, MT, MM, TP
extends and refines knowledge of ways that, through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas.	AS, LW, EC, MD, Mw, E, FC, FS, EP, MT, MM, TP, all Discovery Decks
Sixth Grade	
Grade Level Expectation	STC and/or STC/MS Unit(s)
The Nature of Matter	
knows ways in which substances differ (for example, mass, volume, shape, density, texture, reaction to heat and light).	Mw, FC, FS, FS DD, EP, HBS, CE, POM, OMM, ES, L, EECD
understands that mass is the amount of material in an object.	FS, POM, EMM, ES
understands that increasing the average motion of the particles in a substance increases the temperature of the substance.	POM
understands that decreasing the average motion of the particles decreases the temperature.	POM
determines the effect of a change in temperature on common materials (for example, butter, food coloring in water, isopropol alcohol).	FC DD, CE, POM
understands that matter may exist as solids, liquids, and gases.	E, FC, FS, FS DD, HBS, CE, POM, OMM, ES, L
knows that molecular motion increases from solids to liquids to gases.	POM
knows the physical properties of various substances.	Mw, E, FC, FS, EP, MT, MM, TP, all STC/MS units
knows the chemical properties of various substances.	HBS, POM, OMM, EECD
knows the difference between a physical and chemical change.	Mw, FC, FS, MM, TP, HBS (chemical only), POM (physical only)
knows that equal volumes of different substances may have different masses.	FS, FS DD, POM
uses the water displacement method to find the volume of common items (for example, rocks, nails, marbles).	FS, POM
understands that particles and objects may be either neutral or have a positive or negative charge.	EECD
knows the properties of waves (frequency, amplitude, wavelength).	L
knows how to compare and contrast the properties of particles and waves.	L
understands the behavior of charged particles as evidenced by simple static electricity experiments.	EECD

determines the charge of an ion by comparing the number of protons and electrons associated with it.	
knows forms of radiant energy and their applications to everyday life (for example, visible, microwave, radio).	CE
Energy	
knows different types of energy and the units used to quantify the energy (for example, solar, nuclear, electrical, chemical).	E, FC, EP, MM, all STC/MS units
understands that energy can be converted from one form to another (for example, solar energy to heat energy).	FC, EP, MM, HBS, EMM, OMM, ES, L, EECD
understands that energy can be changed in form.	HBS, EMM, OMM, ES, L, EECD
uses examples to demonstrate common energy transformations.	HBS, CE, EMM, OMM, ES, L, EECD
knows types of radiant energy that come to Earth from the Sun (for example, visible, infrared, ultraviolet).	MT, CE, OMM, ES, L, EECD
knows the effect of sunlight on photosynthetic pigments.	OMM, L
understands that energy moves through systems.	HBS, CE, EMM, OMM, ES, L, EECD
Force and Motion	
knows that a change in motion and position can be measured.	MT, EMM, ES
knows ways to measure time intervals.	EMM, ES
knows ways to estimate speed.	MT, EMM
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.	CE, L
recognizes the result of several forces acting on an object.	CE, EMM, ES
knows that the net force is dependent on the direction and magnitude of forces acting on a body.	EMM, ES
knows uses of simple machines.	MT, TP, EMM
knows advantages and disadvantages of simple machines.	MT, TP, EMM
knows that an object at rest will stay at rest unless acted upon by an outside force.	EMM, ES
knows objects in motion will remain in motion unless acted upon by an outside force.	EMM, ES
knows that gravity is a force that causes an object to fall to the ground.	EMM, ES
knows that gravity causes an object to have weight.	FS, POM, EMM, ES
Processes that Shape the Earth	
understands that the surface of the Earth is constantly changing due to mechanical and chemical action.	CE, ES
knows that sedimentary rock may contain fossils of plants, animals, and microbes.	ES
knows ways the systems of Earth change over time and predicts the causes of the change.	CE, OMM, ES
knows that different events on the Earth change features on Earth (for example, hurricanes, earthquakes, volcanoes).	CE, ES
records seasonal changes of the landscape in a specific area over time.	
knows ways that plants and animals reconstitute the soil and alter the landscape.	E, OMM
understands the processes that prevent or cause erosion.	CE, ES

understands the range of time over which natural events occur (for example, lightning in seconds, mountains form over many years).	CE, OMM, ES
knows that a change in the environment affects the quality of life in different ways for different organisms.	E, CE, OMM, ES
knows positive and negative consequences of human action on the Earth's systems (for example, farming, transportation, mining, manufacturing).	E, CE, POM, OMM, ES, EECD
Earth and Space	
knows the relationship between tides on Earth and the positions of the Moon, the Sun, and Earth.	CE, ES
knows the relative sizes of the planets, Sun, Solar System, galaxy, and universe.	ES
understands the positions of the Earth, Moon, and Sun during a solar eclipse and a lunar eclipse.	MT, ES
understands that our Sun is one of many stars in our galaxy.	ES
Processes of Life	
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).	Mw, E, FC, EP, HBS, OMM
understands the differences between growth and maintenance.	HBS, OMM
knows that the cell is the basic unit of structure and function in all living things.	Mw, EP, HBS, OMM
knows that there is great diversity among unicellular organisms.	Mw, OMM
knows the basic processes that occur in cells.	Mw, EP, HBS, OMM
knows that in multicellular organisms cells grow and divide to form and repair various organs and tissues.	Mw, HBS, OMM
understands cells reproduce to ensure the growth and repair of tissue.	Mw, HBS, OMM
knows that the levels of structural organization in living things include cells, tissues, organs, systems, and organisms.	Mw, HBS, OMM
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).	HBS, OMM
understands the process of osmosis and diffusion.	HBS, OMM (diffusion only)
knows the essential functions in cells.	HBS, OMM
uses or constructs models of plant and animal cells to identify the basic structures of each.	Mw, EP, OMM
knows the functions of structures in plant and animal cells.	Mw (plant cells only), HBS (animal cells only), OMM
knows that behavior is a response to the environment.	Mw, E, EP, EP DD, HBS, OMM
knows adaptations that aid in species survival (for example, protective coloration, hibernation, delayed implantation).	Mw, Mw DD, E, E DD, OMM
How Living Things Interact with Their Environment	
understands that living things are sorted for convenience and identification.	Mw DD, E, OMM
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.	Mw DD, E, OMM
knows the nonliving (abiotic) and living (biotic) aspects of an ecosystem.	E, OMM
understands how the components of an ecosystem interact.	E, OMM

understands that food chains show specific trophic relationships and food webs are used to illustrate interrelationships of trophic levels.	E, E DD, OMM
knows renewable and nonrenewable energy sources.	OMM
distinguishes between biotic and abiotic factors in the environment.	E, OMM
understands that changes in the environment may influence the size, number, or diversity of organisms in an area.	E, OMM, ES
understands that humans are a part of an ecosystem and their activities may deliberately or inadvertently alter the equilibrium in the ecosystem.	E, OMM
The Nature of Science	
knows ways scientific theories may change with new discoveries.	All STC/MS units
understands that new technology may lead to new discoveries.	MT, TP, all STC/MS units
uses systematic, scientific processes to develop and test hypotheses.	Mw, E, FC, FS, EP, MT, MM, TP, all STC/MS units
knows that the scientific method is a process that involves a logical and empirical but flexible approach to problem solving.	Mw, E, FC, FS, EP, MT, MM, TP, all STC/MS units
knows that the disciplines of science provide in depth study and information that becomes available for all to share and use.	Mw, E, FC, FS, EP, MT, MM, TP, all STC/MS units
knows that accurate record keeping, openness, and replication are essential to maintaining an investigator's credibility with other scientists and society.	Mw, E, FC, FS, EP, MT, MM, TP, all STC/MS units
uses accurate records, openness, and replication of experiments to ensure credibility.	Mw, E, FC, FS, EP, MT, MM, TP, all STC/MS units
understands the importance of the control in an experiment.	Mw, E, FC, FS, EP, MT, MM, TP, all STC/MS units
knows how to identify the independent and dependent variables in an experiment.	All STC/MS units
uses appropriate experimental design, with consideration for rules, time, and materials required to solve a problem.	MT, all STC/MS units
knows selected scientists and their accomplishments.	Mw, Mw DD, E DD, FC, FC DD, FS, FS DD, EP, EP DD, MT, MT DD, MM, MM DD, TP, TP DD, all STC/MS units
knows that scientists who make contributions to knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.	Mw, Mw DD, E DD, FC, FS, EP, EP DD, MT, MM, MM DD, TP, TP DD, all STC/MS units
uses criteria necessary to determine the veracity of the data.	Mw, E, FC, FS, EP, MT, MM, TP, all STC/MS units
knows that most natural events occur in patterns.	All STC/MS units
knows that science ethics demand that scientists must not knowingly subject coworkers, students, the neighborhood, or the community to health or property risks.	All STC/MS units
uses appropriate procedures for safety in the classroom, home, and community.	All STC and STC/MS units, and Discovery Decks (classroom only)
knows that appropriate care, safe practices, and ethical treatment are necessary when animals are involved in scientific research.	E, HBS, OMM

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.	HBS
knows some ways that scientific discoveries create new technologies that affect society (for example, geographic information systems, gene mapping, electronic communication).	All STC/MS units
knows that the advancement of science, mathematics, and technology is ongoing and influenced by a diverse population of scientists.	Mw, all STC/MS units
knows that scientific contributions may result in diverse technological products.	Mw, HBS, CE, POM, EMM, ES, L, EECD
uses a computer to collect, analyze, and report scientific findings.	Compatible with all STC and STC/MS units
Seventh Grade	
Grade Level Expectation	STC and/or STC/MS Unit(s)
The Nature of Matter	
uses a variety of measurements to describe the physical properties of matter (for example, volume and mass).	HBS, CE, POM, OMM, ES, L
understands that weight is the result of gravitational pull on an object.	POM, EMM, ES
knows the difference between heat and temperature.	CE, POM
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.	POM (extension only)
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.	POM
knows that chemical changes result in new substances with different characteristics.	HBS, POM
knows chemical and physical changes that occur in nature.	HBS, POM, OMM
determines the volumes of different substances that have equal masses.	POM
knows that charged particles and objects will attract or repel each other.	EECD
knows the relationship between frequency and wavelength (the greater the frequency of the wave, the smaller the wavelength of the wave).	L
understands that protons and neutrons are located in the nucleus of the atom while electrons exist in areas of probability outside of the nucleus.	POM (atomic theory may be taught as an extension only)
understands that the mass of an atom is concentrated in the nucleus where the protons and neutrons are located.	POM (atomic theory may be taught as an extension only)
determines the mass number and atomic number of an atom from the number of protons and neutrons.	POM (atomic theory may be taught as an extension only)
understands that most of the atom is empty space.	POM (atomic theory may be taught as an extension only)
knows uses of radiation, light, and thermal energy to improve the quality of life for human beings (for example, cooking food, treating disease).	EMM, ES, L, EECD

Energy	
knows examples of uses of energy in the home and ways to measure its use.	MT, EMM (uses only), EECD
knows the difference between potential and kinetic energy.	EMM
knows ways to change energy from potential to kinetic.	EMM
knows the characteristics, effects, and common uses of ultraviolet, visible and infrared light.	CE (visible light only), ES, L, EECD
knows that useful energy is lost as heat energy in every energy conversion.	EMM, L, EECD
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.	EECD
Force and Motion	
knows that the motion of an object can be described by its position, direction of motion, and speed.	MT, MM, EMM, ES
knows factors that influence the amount of damage vibrations can cause.	CE
knows intensity of some common waves.	CE
knows some causes and effects of waves.	CE, L
knows the properties of forces.	EMM, ES
knows that like poles of the magnet (two north poles or two south poles) will repel and opposite poles (north and south) will attract.	MM, MM DD
knows that a simple electromagnet uses both electrical force and a magnetic force.	MM, MM DD, EECD
knows the difference between parallel and series circuits.	MM, EMM, EECD
knows that objects in a vacuum accelerate at a constant rate.	L
understands that as objects fall to Earth, speed increases until they reach terminal velocity.	EMM
understands uses and combinations of simple machines in complicated machines.	EMM
understands that gravity is a force exerted on a mass that causes an object to have weight.	POM, EMM, ES
knows that gravity is a force that holds the Solar System together.	EMM, ES
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).	CE, ES
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.	OMM
understands that changes on the surface of the Earth affect living systems.	CE, OMM, ES
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).	OMM

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).	TP, TP DD, POM, EMM, EECD
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.	ES
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.	MT, ES
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.	ES
understands that the tilt of the Earth on its axis as it rotates causes seasonal changes.	CE, ES
knows characteristics of the inner planets and outer planets.	ES
knows basic features of the Moon and the moons of other planets.	MT, MT DD (Moon only), ES
knows some of the constellations of stars in the sky.	ES
knows why stars appear to move across the sky.	ES
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).	HBS, OMM
understands the concept of multicellular organisms.	HBS, OMM
understands that there are many similarities among the great diversity of living things.	EP, OMM
determines the behavioral responses of different organisms to common stimuli (for example, temperature, light, pressure, moisture).	EP, EP DD, MM DD, HBS (humans only), OMM
knows the differences between and advantages of sexual and asexual reproduction.	EP, EP DD, OMM
knows common types of asexual reproduction.	OMM
knows the life cycles of a variety of organisms, including non-flowering and flowering plants, insects, amphibians, reptiles, birds, and mammals.	EP (amphibians, reptiles and birds not included), OMM
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.	HBS
knows ways that viruses depend on other living things.	HBS
knows that viruses may cause diseases in other living things.	HBS
knows that biological adaptations include changes in structures, behaviors, or physiology that enhance reproductive success in a particular environment.	OMM

knows how to design and use a dichotomous guide to identify organisms based on structural characteristics.	OMM
understands how the carbon dioxide-oxygen cycle, water cycle, and nitrogen cycle are important for the survival of organisms.	OMM (nitrogen cycle not included)
knows the interrelationships in a local ecosystem.	
understands ways matter is recycled (for example, water cycle, carbon cycle).	OMM
knows that life on earth is dependent upon a continuous supply of energy from the sun.	OMM, ES, L
understands that individual food chains occur within a food web and that both show the flow of energy.	OMM
understands the importance of informed use of natural resources.	TP, OMM, EECD
knows biotic and abiotic components in a small, local area and ways they interact (for example, field, pond).	OMM
understands the consequences that might result when changes occur in populations.	OMM
understands that changes in one part of the ecosystem will affect other parts of the ecosystem.	OMM
knows possible causes for a species to become threatened, endangered, or extinct.	OMM, ES
knows ways that human activities may deliberately or inadvertently alter the equilibrium in the ecosystem.	OMM
The Nature of Science	
understands that new scientific knowledge is often used to reevaluate existing theories.	All STC/MS units
uses systematic, scientific processes to solve problems and reach conclusions.	EP, MT, MM, TP, all STC/MS units
knows that science disciplines differ from one another in topic, techniques, and outcomes but that they share a common purpose, philosophy, and enterprise.	All STC/MS units
extends and refines use of accurate records, openness, and replication of experiments to ensure credibility.	All STC/MS units
extends and refines knowledge of how to identify the independent and dependent variables in an experiment.	All STC/MS units
extends and refines use of appropriate experimental design, with consideration for rules, time, and materials required to solve a problem.	All STC/MS units
uses rules, time, and materials in ways that ensure the identification and separation of variables in an experiment to solve a problem.	EP, all STC/MS units
extends and refines knowledge of selected scientists and their accomplishments and recognizes their varied backgrounds, talents, interests, and goals.	All STC/MS units
uses criteria necessary to determine the validity of a scientific experiment.	EP, MT, MM, TP, all STC/MS units
knows that natural events (for example, seasons, hurricanes) occur in patterns.	All STC/MS units
knows that science ethics demand that scientists must not knowingly subject coworkers, students, the neighborhood, or the community to health or property risks.	All STC/MS units

uses appropriate procedures for safety in the classroom, home, and community.	All STC and STC/MS units and Discovery Decks (classroom only)
knows the care, safe practices, and ethical treatment that are appropriate when using animals in field and laboratory research.	HBS, OMM
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.	HBS
knows that the designs used for technological improvements should consider the values of society (economic, political, social, ethical, aesthetic).	All STC/MS units
uses knowledge of political, social, and economic ramifications of certain scientific research to evaluate its role in society.	All STC/MS units
knows that scientific and technological contributions are made by individuals of different ethnic, economic, and cultural backgrounds.	EP DD, MT, MT DD, MM DD, TP, TP DD, all STC/MS units
knows that scientific contributions may result in diverse technological products.	HBS, CE, POM, EMM, ES, L, EECD
extends and refines use of a computer to collect, analyze, and report scientific findings.	Compatible with all STC/MS units
Eighth Grade	
Grade Level Expectation	STC/MS Unit(s)
The Nature of Matter	
determines the physical properties of matter that can be observed without altering the substance (for example, mass, volume, boiling point, density).	HBS, CE, POM, OMM, ES, L
knows the difference between transparent, translucent, and opaque objects.	L
understands that weight will vary with the location of the mass in the universe, but the mass will remain constant.	POM, EMM, ES
knows that the average kinetic energy of the atoms or molecules of different objects varies with their temperature.	POM (extension only)
understands that changes in energy cause phase changes.	POM (extension only)
knows how to use clues (for example, change in color or form) to determine whether a change is chemical or physical.	
determines the relationship between mass and volume of an assortment of common substances.	POM
knows that matter is mostly neutral, but that particles can attain a charge by the gain or loss of electrons.	
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).	L
understands the relationship of energy and wavelength to the electromagnetic spectrum.	L
knows that there is an energy difference between an electron near the nucleus and one further away.	
knows that when electrons are transferred from one substance to another, the general properties of both substances change.	POM (extension only)
extends and refines knowledge of uses of forms of energy to improve the quality of life.	EMM, ES, L, EECD

Energy	
understands that energy can be transferred by radiation, conduction, and convection.	CE, ES, L
knows examples of natural and man-made systems in which energy is transferred from one form to another.	EMM, OMM, ES, L, EECD
understands how the principle of conservation of energy is applied during an energy transfer.	EMM
knows ways to measure the various forms of energy that come from the Sun.	CE, ES, L, EECD
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).	EMM, L
knows that a transfer of thermal energy occurs in chemical reactions.	
knows the processes by which thermal energy tends to flow from a system of higher temperature to a system of lower temperature.	POM
knows that the average kinetic energy of the atoms or molecules that make up an object changes when the temperature of the object changes.	POM (extension only)
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).	CE, ES
knows that sound travels in a medium (cannot travel in a vacuum), and travels at different speeds through various media.	
knows the parts of a wave (crest, trough, wavelength, amplitude).	L
understands that wavelength determines the colors of visible light.	L
understands that wavelength determines the pitch of sound.	
knows that waves vary greatly in character (for example, sound, ultraviolet, infrared, ocean waves).	L
understands that as energy is transferred from one system to another there is a reduction in the amount of useful energy.	EMM, L, EECD
knows that energy transfer is not efficient.	EMM, L, EECD
understands how fossil fuels are formed in the Earth, why they are nonrenewable, and the advantages and disadvantages of their use.	
Force and Motion	
knows that speed, velocity, and acceleration can be calculated, estimated, and defined.	EMM, ES
knows that the magnitude of linear acceleration can be calculated.	EMM
knows ways to measure the frequency of waves.	
knows some technological devices that use wave energy (for example, sonar, ultrasound, laser).	CE, L
knows that many forces act at a distance.	EMM, ES
knows some common contact forces (for example, friction, buoyancy, tension).	EMM, ES
recognizes the forces that act on a given object.	EMM, ES
knows that the overall effect of a force can be predicted.	EMM, ES
knows that forces may be balanced or unbalanced.	EMM, ES
understands that unbalanced forces cause objects to accelerate.	EMM, ES

knows that simple machines can be used to change the direction or size of a force.	EMM
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.	EMM, ES
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).	EMM, ES
knows that gravity is a universal force that every mass exerts on every other mass.	EMM, ES
Processes that Shape the Earth	
uses observations and tests to identify mineral samples.	
understands how sedimentary, igneous, and metamorphic rocks are formed and categorized.	CE
knows that over the whole Earth, organisms are growing, dying, and decaying and new organisms are being produced.	OMM
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).	CE, OMM, ES
extends and refines knowledge of ways in which living things reshape the landscape.	OMM
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).	CE, ES
understands that quality of life is relevant to personal experience.	
knows that legislation can be adopted to protect the Earth from detrimental human activities.	
Earth and Space	
knows that available data from various satellite probes show similarities and differences among planets and their moons in our Solar System.	ES
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).	ES
knows that stars appear to be made of similar chemical elements, although they differ in age, size, temperature, and distance.	
knows that thousands of other galaxies appear to have the same elements, forces, and forms of energy found in our Solar System.	
Processes of Life	
understands that living things are composed of major systems that function in reproduction, growth, maintenance, and regulation.	HBS, OMM
knows the structures of cells, and their function and ways these mirror the structure and function of multicellular organisms.	OMM
understands that cells of unicellular organisms are similar to those of multicellular organisms.	OMM

knows the processes of division, growth, and maturation that occur during the cell cycle.	OMM
knows some of the functions of some types of cells, tissues, organs, and systems in advanced organisms.	HBS, OMM
understands that the diversity of cell structure permits a diversity of functions for the organism.	HBS, OMM
knows that the cell is a system of organelles that mirrors the systems within multicellular organisms.	OMM
knows that the cells with similar functions have similar structures, whereas those with different structures have different functions.	HBS, OMM
uses tools to identify and compare cell structures (for example, microscope, hand lenses, bioscopes).	OMM
knows ways behaviors that are responses to the environment may alter the normal growth, development, maintenance, and reproduction of an organism.	OMM
knows the difference between spores and seeds in plant reproduction.	OMM
knows that the flower is the reproductive body of a vascular plant and that it is adapted for pollination.	OMM
knows the difference between meiosis and mitosis and when each occurs.	OMM
knows how dominant and recessive traits are inherited.	OMM
uses a Punnett square to predict the results of crosses between pure and hybrid organisms.	OMM
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).	OMM
knows ways organisms are adapted to their environment.	HBS, OMM
understands that species have characteristics that enable their populations to cycle within varying periods of time (minutes to hundreds of years).	OMM
knows that the fossil record provides evidence that changes in the kinds of plants and animals in the environment have been occurring over time.	ES
The Nature of Science	
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.	All STC/MS units
extends and refines use of systematic, scientific processes to develop and test hypotheses.	All STC/MS units
knows that the study of the events that led scientists to discoveries can provide information about the inquiry process and its effects.	All STC/MS units
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.	All STC/MS units
extends and refines use of accurate records, openness, and replication of experiments to ensure credibility.	All STC/MS units

extends and refines knowledge of how to identify the independent and dependent variables in an experiment.	All STC/MS units
extends and refines use of appropriate experimental design, with consideration for rules, time, and materials required to solve a problem.	All STC/MS units
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.	All STC/MS units
extends and refines knowledge of selected scientists and their accomplishments and recognizes their varied backgrounds, talents, interests, and goals.	All STC/MS units
extends and refines use of criteria necessary to determine the validity of a scientific experiment.	All STC/MS units
knows that statistical tests are used to confirm the significance of data.	
understands the importance for looking for patterns in natural events.	All STC/MS units
knows that science ethics demand that scientists must not knowingly subject coworkers, students, the neighborhood, or the community to health or property risks.	All STC/MS units
uses appropriate procedures for safety in the classroom, home, and community.	All STC/MS units (classroom only)
extends and refines knowledge of the care, safe practices, and ethical treatment that are appropriate when using animals in field and laboratory research.	HBS, OMM
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.	HBS
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.	HBS, CE, POM, EMM, ES, L, EECD
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.	All STC/MS units
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.	All STC/MS units
knows ways the scientific enterprise is global and available to all.	All STC/MS units
uses a variety of technologies to collect, analyze, and report scientific findings.	All STC/MS units
knows that the quantity of scientific information available is increasing at an exponential rate due to the advances in technology.	HBS, CE, POM, OMM, ES, L, EECD