

## NeSA-Science Vocabulary

### INQUIRY, THE NATURE OF SCIENCE, AND TECHNOLOGY

#### Grade 2

<b>Abilities to do Scientific Inquiry</b>	<b>SC2.1.1 Students will ask questions and conduct investigations that lead to observations and communication of findings.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC2.1.1.c Select and use simple tools appropriately	balance	a tool used to determine the weight of an object
	hand lens	a tool that makes objects viewed through it appear larger
SC2.1.1.e Collect and record observations	observation	the act of viewing and noting characteristics of objects or events

#### Grade 5

<b>Abilities to do Scientific Inquiry</b>	<b>SC5.1.1 Students will plan and conduct investigations that lead to the development of explanations.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC5.1.1.a Ask testable scientific questions	testable question	a question that can be answered through an investigation where one part of an experiment is allowed to change and all other parts are kept the same
SC5.1.1.b Plan and conduct investigations and identify factors that have the potential to impact an investigation	investigation (experiment)	a series of controlled steps, which can be repeated, for the purpose of answering a testable question
	variable	a measurable object, condition, or event, which can be changed
SC5.1.1.c Select and use equipment correctly and accurately	microscope	a tool that uses a combination of lenses to produce a greatly magnified image of an object too small to be seen in detail by the naked eye
	telescope	a tool that uses a combination of lenses to make distant objects appear larger and nearer
	thermometer	a tool to measure temperature
SC5.1.1.d Make relevant observations and measurements	measurement	an amount or size determined by comparison with a known quantity
SC5.1.1.e Collect and organize data	data	information, often in the form of facts or figures, obtained from experiments or surveys
SC5.1.1.f Develop a reasonable explanation based on collected data	explanation	a statement giving reasons for information obtained from experiments
SC5.1.1.g Share information, procedures, and results with peers and/or adults	procedure	a series of steps, done in a particular order, to answer testable (scientific) questions
SC5.1.1.h Provide feedback on scientific investigations	feedback	the return of information about the result of a scientific investigation which modify, correct, or strengthen the investigation
SC5.1.1.i Use appropriate mathematics in all aspects of scientific inquiry		

Grade 8		
Inquiry, the Nature of Science, and Technology		
Abilities to do Scientific Inquiry	SC 8.1.1 Students will design and conduct investigations that will lead to descriptions of relationships between evidence and explanations.	
Curricular Indicator	Term	Definition
SC 8.1.1.a Formulate testable questions that lead to predictions and scientific investigations	prediction	a statement about what may happen in the future based on prior experience or knowledge
SC 8.1.1.b Design and conduct logical and sequential investigations including repeated trials	repeated trials	the number of times procedures are repeated, usually 3-5, during a scientific experiment in order to achieve a more accurate result
SC 8.1.1.c Determine controls and use dependent (responding) and independent (manipulated) variables	controlled variables	the variables in an experiment which are held constant to test the effect of the independent variable upon the dependent variable
	dependent variable (responding)	the variable, within a scientific experiment, which is affected by changes in the independent variable of the experiment
	independent variable (manipulated)	a variable that is changed by the person conducting the experiment and not changed by other variables in the experiment
SC 8.1.1.d Select and use equipment appropriate to the investigation, demonstrate correct techniques	graduated cylinder	a tall, narrow container with a volume scale used to measure liquids
SC 8.1.1.e Make qualitative and quantitative observations	qualitative observation	characteristics of objects or events, other than actual numerical measurements
	quantitative observation	characteristics of objects or events which can be measured using numeric values
SC 8.1.1.f Record and represent data appropriately and review for quality, accuracy, and relevancy		
SC 8.1.1.g Evaluate predictions, draw logical inferences based on observed patterns/relationships, and account for non-relevant information	conclusion	a decision made after considering relevant facts and evidence
	inference	a conclusion drawn from evidence or reasoning
	law	a descriptive generalization about how some aspect of the natural world behaves under stated circumstances
SC 8.1.1.h Share information, procedures, results, and conclusions with appropriate audiences		
SC 8.1.1.i Analyze and provide appropriate critique of scientific investigations	scientific critique	an analysis of the strengths and weaknesses of a scientific investigation
SC 8.1.1.j Use appropriate mathematics in all aspects of scientific inquiry		

Grade 11

Inquiry, the Nature of Science, and Technology

<b>Abilities to do Scientific Inquiry</b>	<b>SC12.1.1 Students will design and conduct investigations that lead to the use of logic and evidence in the formulation of scientific explanations and models.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC12.1.1.a Formulate a testable hypothesis supported by prior knowledge to guide an investigation	hypothesis	a testable statement about the natural world that can be used to develop inferences and explanations
SC12.1.1.b Design and conduct logical and sequential scientific investigations with repeated trials and apply findings to new investigations	control group	a group of subjects, closely resembling the experimental group but not receiving the factor under study, which serves as a comparison to the experimental group
	experimental group	a group of subjects which receive the factor under study
SC12.1.1.c Identify and manage variables and constraints		
SC12.1.1.d Select and use lab equipment and technology appropriately and accurately		
SC12.1.1.e Use tools and technology to make detailed qualitative and quantitative observations		
SC12.1.1.f Represent and review collected data in a systematic, accurate, and objective manner		
SC12.1.1.g Analyze and interpret data, synthesize ideas, formulate and evaluate models, and clarify concepts and explanations	theory	a well-substantiated explanation of some aspect of the natural world that can incorporate facts, laws, inferences, and tested hypotheses
SC12.1.1.h Use results to verify or refute a hypothesis		
SC12.1.1.i Propose and/or evaluate possible revisions and alternate explanations		
SC12.1.1.j Share information, procedures, results, conclusions, and defend findings to a scientific community (peers, science fair audience, policy makers)		
SC12.1.1.k Evaluate scientific investigations and offer revisions and new ideas as appropriate		
SC12.1.1.l Use appropriate mathematics in all aspects of scientific inquiry		

# PHYSICAL SCIENCE

## Grade 2

Matter	<b>SC2.1.1 Students will observe and describe properties of objects and their behavior.</b>	
Curricular Indicator	Term	Definition
SC2.1.1.a Observe physical properties of objects (freezing and melting, sinking and floating, color, size, texture, shape, weight)	color	one of many ways to describe how things look (e.g. red, blue, yellow)
	floating	sits on the surface of a liquid
	freezing	to change into a solid by getting colder
	melting	to change from a solid to a liquid by getting warmer
	shape	one of the many ways to describe how things look based on the outline of the object
	sinking	to move downward below the surface of a liquid
	size	how big or small something is
	texture	how something feels or looks
	weight	the lightness or heaviness of an object
SC2.1.1.b Sort objects by physical properties (freezing and melting, sinking and floating, color, size, texture, shape, weight)		
SC2.1.1.c Measure objects using standard and non-standard units	centimeters	metric unit of measure for length
	inches	a standard unit of measure for length
	length	the measured distance from one end to the other end of an object
	measure	to find the size or amount of an object
	nonstandard units	the use of everyday things to measure objects (e.g. paperclips, pencils, blocks)
	standard units	a unit of measurement that is the same everywhere and does not change
SC2.1.1.d Identify solids and liquids and recognize that fluids take the shape of their container	liquid	anything that takes the shape of its container
	solid	anything that holds its own shape
Force and Motion	<b>SC2.2.2 Students will compare relative position and motion of objects.</b>	
Curricular Indicator	Term	Definition
SC2.2.2.a State location and/or motion relative to another relative to another object or its surroundings (in front of, behind, between, over, under, faster, slower, forward and backward, up and down)	location (object)	where an object is or where it could be
	motion (object)	an object changing its location

SC2.2.2.b Describe how objects move in many different ways (straight, zigzag, round and round, back and forth, and fast and slow)		
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Grade 5		
Physical Science		
Matter	SC5.2.1 Students will explore and describe the physical properties of matter and its changes.	
Curricular Indicator	Term	Definition
SC5.2.1.a Identify mixtures and pure substances	matter	anything that has mass and takes up space
	mixture	when two or more things are combined, but the things do not change (e.g. cement, trail mix, salad)
	physical properties	how something looks, smells, feels (e.g. color, texture, floating, weight, odor)
	pure substance	matter that cannot be separated into other kinds of matter by any physical process
SC5.2.1.b Identify physical properties of matter (color, odor, elasticity, weight, volume)	Celsius	a standard unit of measure of temperature (metric)
	dimensions	measurement of the size of an object (length, width, height)
	elasticity	ability to go back to the original shape or size after being stretched, pressed, or squeezed together
	Fahrenheit	a standard unit of measure of temperature (nonmetric)
	mass	a property of an object that is a measure of the amount of matter an object has
	quantitative	the amount or number of something
	temperature	the measure of how hot or cold something is
	volume	amount of space an object takes up
SC5.2.1.c Use appropriate metric measurements to describe physical properties	weight	the measure of the force of gravity
	centi	prefix meaning 100
	kilo	prefix meaning 1,000
	liter	a standard unit of measure of volume (metric)
	meter	a standard unit of measure of length (metric)
	metric	a standard system of measurement
SC5.2.1.d Identify state change caused by heating and cooling solids, liquids, and gasses	milli	prefix meaning one thousandth
	gas	matter that takes the shape and volume of its container (e.g. air)

Grade 5		
Physical Science		
Force and Motion	SC5.2.2 Students will identify the influence of forces on motion.	
Curricular Indicator	Term	Definition
SC5.2.2.a Describe motion by tracing and measuring an object's position over a period of time (speed)	speed	the distance an object moves over a given amount of time
SC5.2.2.b Describe changes in motion due to outside forces (push, pull, gravity)	force	a push or a pull
	friction	the force that resists motion between objects that are touching
	gravity	a basic force that attracts all objects to each other
	pull	a force on an object to move the object towards oneself or the cause of the force
	push	a force on an object to move the object away from oneself or the cause of the force
SC5.2.2 c Describe magnetic behavior in terms of attraction and repulsion	attraction (magnetic)	a property of magnetism, a force drawing objects together and resisting separation
	magnetism	the force of push or pull between poles of magnets
	repulsion (magnetic)	a property of magnetism, a force pushing objects apart and resisting attraction
Energy	SC5.2.3. Students will observe and identify signs of energy transfer.	
Curricular Indicator	Term	Definition
SC5.2.3.a Recognize that sound is produced from vibrating objects; the sound can be changed by changing the vibration	sound	waves caused by vibrations through a material which can be heard when they reach a person's or animal's ear
SC5.2.3.b Recognize that light travels in a straight line and can be reflected by an object (mirror)	reflection	bend back, for example when light bounces off an object that it does not go through
SC5.2.3.c Recognize that light can travel through certain materials and not others (transparent, translucent, opaque)	opaque	not able to be seen through
	translucent	allows some light to pass, but does not produce detailed images
	transparent	allows all light to pass through, and objects can be clearly seen
SC5.2.3.d Identify ways to generate heat (friction, burning, incandescent light bulb)	burning	the act of being on fire so as to give off heat
SC5.2.3.e Identify materials that act as thermal conductors or insulators	conductor	a substance or object that can allow electricity, heat, or sound to pass through it easily
	insulator	a substance or object that does not allow electricity, heat, or sound to pass through it easily
SC5.2.3.f Recognize that the transfer of electricity in an electrical circuit requires a closed loop	electrical circuit	a complete path along which electricity moves (closed loop)

Grade 8		
Physical Science		
Matter	SC 8.2.1. Students will identify and describe the particulate nature of matter including physical and chemical interactions.	
Curricular Indicator	Term	Definition
SC 8.2.1.a Compare and contrast elements, compounds, and mixtures	compound	a pure substance composed of two or more elements chemically combined in a fixed proportion
	element	a pure substance that cannot be broken down by chemical or physical means
	periodic table	an arrangement tool of the known elements organized by properties
SC 8.2.1.b Describe physical and chemical properties of matter	chemical properties	characteristics of a substance that determines how it interacts with other substances
SC 8.2.1.c Recognize most substances can exist as a solid, liquid, or gas depending on temperature	condensation	change in the physical state of matter from the gas phase to the liquid phase
	deposition	change in the physical state of matter from the gas phase to the solid phase without passing through the liquid phase
	evaporation	vaporization of a liquid that occurs only on the surface of the liquid
	sublimation	change in the physical state of matter from the solid phase to the gas phase without passing through the liquid phase
	vaporization	change in the physical state of matter from the liquid phase to the gas phase
SC 8.2.1.d Compare and contrast solids, liquids, and gasses based on properties of these states of matter		
SC 8.2.1.e Distinguish between physical and chemical changes (phase changes, dissolving, burning, rusting)	burning	a chemical change in which the substance is decomposed and releases heat
	dissolving	a physical change in which particles of a substance are separated by water particles
	phase change	a change in state of matter (e.g. solid to liquid, liquid to gas)
	rusting	a chemical change in which a metal reacts with oxygen to form a different compound
SC 8.2.1.f Recognize conservation of matter in physical and chemical changes	conservation of matter	matter can neither be created nor destroyed in physical and chemical changes
SC 8.2.1.g Classify substances into similar groups based on physical properties		

Grade 8		
Physical Science		
Force and Motion	SC 8.2.2 Students will investigate and describe forces and motion.	
Curricular Indicator	Term	Definition
SC 8.2.2.a Describe motion of an object by its position and velocity	constant speed	rate of motion where the same amount of distance is traveled in the same amount of time (speed = distance / time)
	velocity	rate of change of position of an object in a specified direction
SC 8.2.2.b Recognize an object that is not being subjected to a force will continue to move at a constant speed in a straight line or stay at rest (Newton's 1st law)		
SC 8.2.2.c Compare the motion of objects related to the effects of balanced and unbalanced forces	balanced forces	two equal forces that act upon an object in opposite directions
	unbalanced forces	two or more forces pushing or pulling against each other resulting in a change in an object's motion
SC 8.2.2.d Recognize that everything on or around Earth is pulled towards Earth's center by gravitational force	gravitational force	the force of attraction between all masses in the universe
Energy	SC 8.2.3 Students will identify and describe how energy systems and matter interact.	
Curricular Indicator	Term	Definition
SC 8.2.3.a Recognize that vibrations set up wave-like disturbances that spread away from the source (sound, seismic, water waves)	wave (mechanical)	the transfer of energy that spreads away from the source (sound, seismic, water)
SC 8.2.3.c Recognize that light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection)	absorption	the transfer of light energy into an object through which it is passing
	refraction	the bending of the path of light when it passes from one medium into another
	scattering	light reflected in all directions by a rough surface
SC 8.2.3.d Recognize that to see an object, light from the surface of the object must enter the eye; the color seen depends on the properties of the surface and the color of the available light sources		
SC 8.2.3.e Recognize that heat moves from warmer objects to cooler objects until both reach the same temperature		
SC 8.2.3.f Describe transfer of energy from electrical and magnetic sources to different energy forms (heat, light, sound, chemical)		

SC 8.2.3.g Recognize all energy is neither created nor destroyed	Law of Conservation of Energy	energy can neither be created nor destroyed in chemical and physical changes
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Grade 11		
Physical Science		
Curricular Indicator	Term	Definition
<b>Matter</b>	<b>SC12.2.1 Students will investigate and describe matter in terms of its structure, composition and conservation.</b>	
SC12.2.1.a Recognize bonding occurs when outer electrons are transferred (ionic) or shared (covalent)	chemical bonding	an attraction between two or more atoms resulting in the formation of different chemical substances
	covalent bond	a form of chemical bond characterized by the sharing of a pair of valence electrons between atoms
	ionic bond	a form of chemical bond characterized by transfer of electrons from one atom to another resulting in the attraction of oppositely charged ions
	molecule	a group of atoms bonded together forming the smallest fundamental unit of a pure substance
	valence electrons	the electrons in the outer shell or energy level that are available for bonding
SC12.2.1.b Describe the energy transfer associated with phase changes between solids, liquids, and gasses		
SC12.2.1.c Describe the three normal states of matter (solid, liquid, gas) in terms of energy, particle arrangement, particle motion, and strength of bond between molecules		
SC12.2.1.d Recognize a large number of chemical reactions involve the transfer of either electrons (oxidation/reduction) or hydrogen ions (acid/base) between reacting ions, molecules, or atoms	acid	a substance that dissolves in water to release a hydrogen ion ( $H^+$ )
	base	a substance that dissolves in water to release a hydroxide ion ( $OH^-$ )
	chemical reactions	changes in chemical substances involving bond breaking and/or bond forming resulting in different chemical substances
SC12.2.1.e Identify factors affecting rates of chemical reactions (temperature, particle size, surface area)	pH	the measure of acidity or alkalinity of a solution
	rate of chemical reaction	the speed at which chemical reactions occur affected by factors such as temperature, substance surface area, agitation, and pH
SC12.2.1.f Recognize the charges and relative locations of subatomic particles (neutrons, protons, electrons)	electron	a negatively charged subatomic particle located outside the nucleus
	neutron	a neutral subatomic particle located inside the nucleus
	proton	a positively charged subatomic particle located inside the nucleus
SC12.2.2.1.g Describe properties of atoms, ions, and isotopes	ion	an atom or group of atoms in which the number of electrons is different from the number of protons resulting in a net charge other than zero
	isotopes	atoms of the same element with different numbers of neutrons
SC12.2.1.h Describe the organization of the periodic table of elements with respect to patterns of physical and chemical properties	periodic law	the law stating many physical and chemical properties of the elements recur periodically as their atomic numbers increase

Grade 11		
Physical Science		
Force and Motion	SC12.2.2 Students will investigate and describe the nature of field forces and their interactions with matter.	
Curricular Indicator	Term	Definition
SC12.2.2.a Describe motion with respect to displacement and acceleration	acceleration	change in velocity ( $a = \Delta v / \Delta t$ )
	displacement	change in position from one point to another (distance and direction)
	$v = d/t$	velocity = displacement / time
SC12.2.2.b Describe how the law of inertia (Newton's 1st law) is evident in a real-world event	inertia	the tendency of an object to resist any change in its motion
SC12.2.2.c Make predictions based on relationships among net force, mass, and acceleration (Newton's 2nd law)	$F = ma$	force = (mass)(acceleration)
	net force	vector sum of all forces acting upon an object
	Newton's 2nd Law	the relationship among net force, mass, and acceleration ( $F = ma$ )
SC12.2.2.d Recognize that all forces occur in equal and opposite pairs (Newton's 3rd law)	Newton's 3rd Law	all forces occur in equal and opposite pairs
SC12.2.2.e Describe how Newton's 3rd law of motion is evident in a real-world event		
SC12.2.2.f Describe gravity as a force that each mass exerts on another mass, which is proportional to the masses and the distance between them	Newton's Law of Universal Gravitation	every mass attracts every other mass with a force directly proportional to the masses and inversely proportional to the distance between them
SC12.2.2.g Recognize that an attractive or repulsive electric force exists between two charged particles and that this force is proportional to the magnitude of the charges and the distance between them	attraction (electric)	opposite charges pull towards one another
	electric force	the force between two charged particles that is directly proportional to the magnitude of the charges and inversely proportional to the distance between them
	repulsion (electric)	like charges push away from one another
Energy	SC12.2.3 Students will describe and investigate energy systems relating to the conservation and interaction of energy and matter.	
Curricular Indicator	Term	Definition
SC12.2.3.a Describe mechanical wave properties (speed, wavelength, frequency, amplitude) and how waves travel through a medium	amplitude (wave)	height of the wave
	frequency (wave)	number of complete waves that pass a point per second
	mechanical wave properties	frequency, wavelength, and speed of a wave through a medium are related by the formula $v=f\lambda$ (A.K.A. $c = \lambda v$ )
	medium	the substance that carries a wave
	wavelength	distance between adjacent crests
SC12.2.3.b. Recognize that the energy in waves can be changed into other forms of energy	forms of energy	kinetic (electrical, heat, light, motion, and sound) and potential (chemical, gravitational, mechanical, and nuclear)
	transformation of energy	energy can transfer from one form to another (e.g. nuclear to heat, chemical to mechanical, electrical to light )
SC12.2.3.c Recognize that light can behave as a	diffraction	bending of light as it passes around the edge of an object

wave (diffraction and interference)

interference

the effect of waves coinciding to create a new wave pattern

Grade 11		
Physical Science		
Energy (con't)	SC12.2.3 Students will describe and investigate energy systems relating to the conservation and interaction of energy and matter.	
Curricular Indicator	Term	Definition
SC12.2.3.d Distinguish between temperature (a measure of the average kinetic energy of atomic or molecular motion) and heat (the quantity of thermal energy that transfers due to a change in temperature)	heat	the kinetic energy that flows between two samples of matter due to their difference in temperature
SC12.2.3.e Compare and contrast methods of heat transfer and the interaction of heat with matter via conduction, convection, and radiation	conduction	transfer of heat energy between heat substances that are in direct contact with one another
	convection	the movement of ensembles of molecules with gases and liquids
	radiation	heat transfer due to electromagnetic waves
SC12.2.3.f Recognize that the production of electromagnetic waves is a result of changes in the motion of charges or by a changing magnetic field	wave (electromagnetic)	a disturbance that travels through space as a result of changes in the motions of charges or changing magnetic field
SC12.2.3.g Compare and contrast segments of the electromagnetic spectrum (radio, micro, infrared, visible, ultraviolet, x-rays, gamma) based on frequency and wavelength	electromagnetic spectrum	a continuum of all electromagnetic waves arranged according to frequency and wavelength
SC12.2.3.h Recognize that nuclear reactions (fission, fusion, radioactive decay) convert a fraction of the mass of interacting particles into energy, and this amount of energy is much greater than the energy in chemical interactions	nuclear reactions	reactions that convert a fraction of mass into energy (e.g. fission, fusion, radioactive decay)
SC12.2.3.i Interpret the law of conservation of energy to make predictions for the outcome of an event	kinetic energy	energy of motion
	potential energy	stored energy
SC12.2.3.j Identify that all energy can be considered to be either kinetic, potential, or energy contained by a field (e.g. electromagnetic waves)		
SC12.2.3.k Identify endothermic and exothermic reactions	endothermic reaction	chemical reaction in which heat is absorbed
	exothermic reaction	chemical reaction in which heat is released

# LIFE SCIENCE

## Grade 2

<b>Structure and Function of Living Systems</b>	<b>SC2.3.1 Students will investigate the characteristics of living things.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC2.3.1.a Differentiate between living and nonliving things	living	things that need food, water, air, space, and shelter
	nonliving	things that do not need food, water, air, space, or shelter
SC2.3.1.b Identify the basic needs of living things (food, water, air, space, shelter)	basic needs	things needed to stay alive including food, water, air, space, and shelter
SC2.3.1.c Identify external parts of plants and animals	external	on the outside
	plant	a living thing that usually has leaves, stems, and roots
	animal	a living thing that eats other plants or animals for food
SC2.3.1.d Observe and match plants and animals to their distinct habitats	habitat	a place where an animal and plant's basic needs are met
<b>Heredity</b>	<b>SC2.3.2 Students will recognize changes in living things.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC2.3.2.a Describe how offspring resemble their parents	offspring	the young produced by a parent
	parents	mother and father
SC2.3.2.b Describe how living things change as they grow	change	when something becomes different
	growth	to become larger or more complex
<b>Biodiversity</b>	<b>SC2.3.4 Students will recognize changes in organisms.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC2.3.4.a Recognize seasonal changes in animals and plants	seasonal	a time of the year (e.g. spring, summer, fall, winter)

Grade 5		
Life Science		
<b>Structure and Function of Living Systems</b>	<b>SC5.3.1. Students will investigate and compare the characteristics of living things.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC5.3.1.a Compare and contrast characteristics of living and nonliving things		
SC5.3.1.b Identify how parts of plants and animals function to meet basic needs (e.g., leg of an insect helps an insect move, root of a plant helps the plant obtain water)	function	the way something works
	structure	the way something is put together
<b>Heredity</b>	<b>SC5.3.2 Students will identify variations of inherited characteristics and life cycles.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC5.3.2.a Identify inherited characteristics of plants and animals	inherited characteristics	a characteristic that is passed from parent to offspring
SC5.3.2.b Identify the life cycle of an organism	life cycle	stages that an organism goes through as it grows and matures
<b>Flow of Matter and Energy in Ecosystems</b>	<b>SC5.3.3 Students will describe relationships within an ecosystem.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC5.3.3.a Diagram and explain a simple food chain beginning with the Sun	food chain	the sequence of who eats whom in a biological community
SC5.3.3.b Identify the role of producers, consumers, and decomposers in an ecosystem	community	a group of organisms that live together and share resources
	consumer	organisms that eats other organisms to get energy
	decomposer	organism that feeds on dead organisms
	ecosystem	a community of organisms and its environment
	producer	organisms that make their own food
SC5.3.3.c Recognize the living and nonliving factors that impact the survival of organisms in an ecosystem	survival	ability of an organism to stay alive
SC5.3.3.d Recognize all organisms cause changes, some beneficial and some detrimental, in the environment where they live		
<b>Biodiversity</b>	<b>SC5.3.4 Students will describe changes in organisms over time.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC5.3.4.a Describe adaptations made by plants or animals to survive environmental changes	adaptations	changes made to organisms to help it meet its needs

Grade 8		
Life Science		
Structure and Function of Living Systems	SC 8.3.1 Students will investigate and describe the structure and function of living organisms.	
Curricular Indicator	Term	Definition
SC 8.3.1.a Recognize the levels of organization in living organisms (cells, tissues, organs, organ systems, organisms)	cell	basic unit of life found in all living things
	organ	a group of tissues that work together to carry out a specific function
	organ system	a group of organs that work together, within an organism, to carry out a specific function
	organism	any living thing
	tissue	a group of specialized cells
SC 8.3.1.b Recognize that all organisms are composed of one or many cells; that these cells must grow, divide, and use energy; and that all cells function similarly	cell division	process by which a cell splits into two new cells
	cell growth	process by which a cell increases its size
	energy	the ability to do work (e.g. light, heat, sound)
SC 8.3.1.c Recognize specialized cells perform specialized functions in multicellular organisms		
SC 8.3.1.d Identify the organs and functions of the major systems of the human body and describe ways that these systems interact with each other	circulatory system	system that provides a flow of nutrients throughout the body
	digestive system	system that breaks down food into energy for the body
	endocrine system	system of glands that make hormones to regulate the body
	excretory system	system that removes excess, unneeded, or dangerous materials from the body
	immune system	system that protects the body against infection
	integumentary system	system that is the natural outer covering of an organism
	nervous system	system that regulates the body's response to stimuli
	muscular system	system that allows movement of an organism
	reproductive system	system that allows the production of offspring
	respiratory system	system that brings oxygen into the body and releases carbon dioxide
skeletal system	system that supports and protects the body	
SC 8.3.1.e Describe how plants and animals respond to environmental stimuli	response	reaction of an organism to a stimulus
	stimulus	signal to which an organism responds

Grade 8		
Life Science		
Heredity	SC 8.3.2 Students will investigate and describe the relationship between reproduction and heredity.	
Curricular Indicator	Term	Definition
SC 8.3.2.a Recognize that hereditary information is contained in genes within the chromosomes of each cell	chromosome	structure found in the nucleus that carries the genetic information for an organism
	dominant	one form of a gene that masks the presence of another gene
	gene	small part of a chromosome that determines a specific trait
	heredity	passing of traits from one generation to another
SC 8.3.2.b Compare and contrast sexual and asexual reproduction	recessive	form of a gene that is masked by the presence of another gene
	asexual reproduction	process by which a single organism can reproduce by itself
	sexual reproduction	process by which sex cells from two organisms join to create a new organism
Flow of Matter and Energy in Ecosystems	SC 8.3.3 Students will describe populations and ecosystems.	
Curricular Indicator	Term	Definition
SC 8.3.3.a Diagram and explain the flow of energy through a simple food web	food web	complex interactions of food chains that interact in an ecosystem
	predator	organism that captures and feeds on another organism
	prey	organism that is captured and fed upon by another organism
SC 8.3.3.b Compare the roles of producers, consumers, and decomposers in an ecosystem		
SC 8.3.3.c Recognize that producers transform sunlight into chemical energy through photosynthesis	photosynthesis	process by which organisms use light energy to make food energy
SC 8.3.3.d Determine the biotic and abiotic factors that impact the number of organisms an ecosystem can support	abiotic	any nonliving part of the environment that affect organisms
	biotic	any living part of the environment that affect organisms
	carrying capacity	largest number of individuals of a species that a particular environment can support
SC 8.3.3.e Recognize a population is all the individuals of a species at a given place and time	population	group of organisms of the same species that live in the same area
	species	a group of organisms that is capable of reproducing similar organisms
SC 8.3.3.f Identify symbiotic relationships among organisms	commensalism	relationship between organisms where one benefits and the other is unaffected
	mutualism	a relationship between organisms where both benefit
	parasitism	relationship between organisms where one organism benefits and the other is harmed
	symbiosis	a close, long-term interaction between species
SC 8.3.3.g Identify positive and negative effects of natural and human activity on an ecosystem		

Grade 8

Life Science

**Biodiversity**

**SC 8.3.4 Students will identify characteristics of organisms that help them survive.**

<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC 8.3.4.a Describe how an inherited characteristic enables an organism to improve its survival rate	survival rate	number of individuals alive after a given period
SC 8.3.4.b Recognize the extinction of a species is caused by the inability to adapt to an environmental change	extinction	end of an organism or group of organisms
SC 8.3.4.c Use anatomical features of an organism to infer similarities among other organisms	anatomical	relating to the structure of the body

Grade 11		
Life Science		
Structure and Function of Living Systems	SC12.3.1 Students will investigate and describe the chemical basis of the growth, development, and maintenance of cells.	
Curricular Indicator	Term	Definition
SC12.3.1.a Identify the complex molecules (carbohydrates, lipids, proteins, nucleic acids) that make up living organisms	carbohydrate	molecule that is the major source of energy for an organism
	lipid	molecule that stores energy and is the main structure of cell membranes
	nucleic acid	building block of living organisms that passes genetic information from one generation to the next (e.g. DNA)
	protein	molecule needed by organisms for growth and repair
SC12.3.1.b Identify the form and function of sub-cellular structures that regulate cellular activities	cell membrane	thin barrier that surrounds all cells that controls what enters and leaves the cell
	cell wall	strong supporting layer around the cell membrane in some cells
	chloroplast	organelle found in some organisms that carries out photosynthesis
	cytoplasm	the fluid portion of a cell's interior
	mitochondria	organelle that converts digested food into cellular energy
	nucleus	organelle that regulates the production of proteins and contains genetic material
	organelle	subcellular structure
	ribosomes	organelle that is the site of protein synthesis
	vacuole	organelle that is used to store materials
SC12.3.1.c Describe the cellular functions of photosynthesis, respiration, cell division, protein synthesis, transport of materials, and energy capture/release	active transport	cell transport that does require energy (e.g. endocytosis, exocytosis)
	cellular respiration	process that releases energy by breaking down food molecules, in the presence of oxygen
	cellular transport	the movement of materials into, out of, or within of a cell
	enzyme	protein that speeds up biological reactions
	metabolism	set of chemical reactions in the cells of living organisms to sustain life
	passive transport	cell transport that does not require energy (e.g. Diffusion, osmosis)
	photosynthesis	process by which energy rich molecules are made from water and carbon dioxide in the presence of light
	protein synthesis	formation of proteins using information coded on DNA
SC12.3.1.d Describe how an organism senses changes in its internal or external environment and responds to ensure survival	selectively permeable	property of biological membranes that allows some substances to pass across, while others cannot
	stimulus	any physical or chemical input that is sensed

Grade 11		
Life Science		
<b>Heredity</b>	<b>SC12.3.2 Students will describe the molecular basis of reproductions and heredity.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC12.3.2.a Identify that information passed from parents to offspring is coded in DNA molecules	DNA	nucleic acid that contains all of the genetic instructions for an organism
	inheritance	passing of genetic material from parent to offspring
	trait	specific characteristic of an individual
SC12.3.2.b Describe the basic structure of DNA and its function in genetic inheritance	double helix	the shape of DNA that resembles a spiral staircase or a twisted ladder
	mitosis	nuclear division in organisms that have a nucleus
	nucleotide	building block of a nucleic acid; consisting of a sugar, phosphate, and a nitrogen base (e.g. adenine, guanine, cytosine, thymine)
SC12.3.2.c Recognizes how mutations could help, harm, or have no effect on individual organisms	mutation	change in the genetic material of a cell
SC12.3.2.d Describe that sexual reproduction results in a largely predictable, variety of possible gene combinations in the offspring of any two parents	alleles	alternate forms of a gene
	genotype	genetic makeup of an organism
	heterozygous	having two different alleles for a particular gene
	homozygous	having two identical alleles for a particular gene
	meiosis	the process of nuclear division that reduces the number of chromosomes in a cell by half
	phenotype	physical characteristics of an organism
	Punnett square	model used to determine probabilities of a genetic cross
<b>Flow of Matter and Energy in Ecosystems</b>	<b>SC12.3.3 Students will describe, on a molecular level, the cycling of matter and the flow of energy between organisms and their environment.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC12.3.3.a Explain how the stability of an ecosystem is increased by biological diversity	biological diversity	the degree of variation of life forms within a given ecosystem
SC12.3.3.b Recognize that atoms and molecules cycle among living and nonliving components of the biosphere	atom	basic unit of matter
	biogeochemical cycle	cycle by which materials necessary for organisms are circulated through the environment (e.g. water, carbon, nitrogen)
	biosphere	area on and around Earth where life exists
SC12.3.3.c Explain how distribution and abundance of different organisms in ecosystems are limited by the availability of matter and energy and the ability of the ecosystem to recycle materials	biome	a group of ecosystems that share similar climates and organisms
SC12.3.3.d Analyze factors which may influence environmental quality	environmental quality	the state of environmental conditions

Grade 11		
Life Science		
Biodiversity	SC12.3.4 Students will describe the theory of biological evolution.	
Curricular Indicator	Term	Definition
SC12.3.4.a Identify different types of adaptations necessary for survival (morphological, physiological, behavioral)	behavioral	related to the way something acts
	morphological	the form or structure of something
	physiological	related to the way something functions
SC12.3.4.b Recognize that the concept of biological evolution is a theory which explains the consequence of the interactions of: (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) the ensuing selection by the environment of those offspring better able to survive and leave offspring	biological evolution	descent with modification of organisms from common ancestors
	genetic variability	tendency of individual genetic characteristics in a population to differ from one another
	recombination	formation of new and different sets of chromosomes or genes
SC12.3.4.c Explain how natural selection provides a scientific explanation of the fossil record and the molecular similarities among the diverse species of living organisms	fossil record	collection of preserved organisms or their traces stored in Earth
	natural selection	process by which organisms that are most suited to their environment survive and reproduce most successfully
SC12.3.4.d Apply the theory of biological evolution to explain diversity of life over time		

# EARTH AND SPACE SCIENCES

## Grade 2

<b>Earth in Space</b>	<b>SC2.4.1 Students will observe and identify objects of the sky.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC2.4.1.a Identify objects in the sky (the Sun, the Moon, the stars) and when they are observable	Moon	a bright object in the sky at night which changes its shape in a recognized pattern
	stars	natural objects in the sky that give off light; the Sun is the star closest to Earth
	Sun	the star closest to Earth; it is the source of Earth's heat and light
SC2.4.1.b Identify objects that appear to move in the sky (the Sun, the Moon, stars)	sunrise	the time of day when the Sun is first visible in the east
	sunset	the time of day when the Sun is no longer visible in the west
<b>Earth Structures and Processes</b>	<b>SC2.4.2 Students will observe, identify, and describe characteristics of Earth's materials.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC2.4.2.a Describe Earth materials (sand, soil, rocks, water)	Earth materials	any of the solid, liquid, (or gaseous materials grades 3-5) materials that make up Earth
SC2.4.2.b Recognize ways in which individuals and families can conserve Earth's resources by reducing, reusing, and recycling	recycle	to use old materials to make new things; you can recycle metal, plastic, and paper to make other things
	reduce	to use a smaller amount of things or products
	reuse	a product or thing that can be used over and over
<b>Energy in Earth's Systems</b>	<b>SC2.4.3 Students will observe simple patterns of change on Earth.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC2.4.3.a Observe that the Sun provides heat and light		
SC2.4.3.b Observe and describe simple daily changes in weather	weather	is what the outside is like at a certain time and place
SC2.4.3.c Describe simple seasonal weather indicators and how they impact student choices (activities, clothing)		

Grade 5		
Earth and Space Sciences		
<b>Earth in Space</b>	<b>SC5.4.1 Students will observe and describe characteristics, patterns, and changes in the sky.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC5.4.1.a Recognize that the observed shape of the Moon changes from day to day during a one month period		
SC5.4.1.b Recognize the motion of objects in the sky (the Sun, the Moon, stars) change over time in recognizable patterns	position	the place where a person or thing is
<b>Earth Structures and Processes</b>	<b>SC5.4.2 Students will observe and describe Earth's materials, structure, and processes.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC5.4.2.a Describe the characteristics of rocks, minerals, soil, water, and the atmosphere	atmosphere	the layer of air that surrounds Earth
	characteristics	something you can observe about an object that can be used to describe the object
	minerals	a basic Earth material; a rock ingredient that cannot be physically broken down any further
	rocks	an Earth material made up of different ingredients called minerals
	soil	the loose material in which plants can grow in the upper layer of Earth
	water	a natural liquid material made up of hydrogen and oxygen
SC5.4.2.b Identify weathering, erosion, and deposition as processes that build up or break down Earth's surface	deposition	the dropping of eroded soil and rock pieces in a new place
	erosion	movement of Earth materials by water, wind, or ice
	weathering	the process by which rocks are broken down into smaller pieces
SC5.4.2.c Identify how Earth materials are used (fuels, building materials, sustaining plant life)		
<b>Energy in Earth's Systems</b>	<b>SC5.4.3 Students will observe and describe the effects of energy changes on Earth.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC5.4.3.a Describe the Sun's warming effect on the land and water		
SC5.4.3.b Observe, measure, and record changes in weather (temperature, wind direction and speed, precipitation)		
SC5.4.3.c Recognize the difference between weather, climate, and seasons	climate	the average temperature and rainfall of an area over many years
<b>Earth's History</b>	<b>SC5.4.4 Students will describe changes in Earth.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>

SC5.4.4.a Describe how slow processes (erosion, weathering, deposition) and rapid processes (landslides, volcanic eruptions, earthquakes) change Earth's surface		
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Grade 8		
Earth and Space Sciences		
Earth in Space	SC 8.4.1 Students will investigate and describe Earth and the solar system.	
Curricular Indicator	Term	Definition
SC 8.4.1.a Describe the components of the solar system (the Sun, planets, moons, asteroids, comets)		
SC 8.4.1.b Describe the relationship between motion of objects in the solar system and the phenomena of day, year, eclipses, phases of the Moon and seasons	axis	an imaginary straight line running through Earth from pole to pole
	eclipse	the blocking of the light from one astronomical object by another
	phase	the portion of a moon or planet that is illuminated
	revolution	the motion of one body around another, like Earth's orbit around the Sun
	rotation	the spinning of a body, like Earth, on its axis
SC 8.4.1.c Describe the effects of gravity on Earth (tides) and the effect of gravity on objects in the solar system	tides	the alternating rise and fall of the surface of the ocean or other large bodies of water
Earth Structures and Processes	SC 8.4.2 Students will investigate and describe Earth's structure, systems, and processes.	
Curricular Indicator	Term	Definition
SC 8.4.2.a Describe the layers of Earth (core, mantle, crust, atmosphere)	core	the innermost layer of Earth, located beneath the mantle
	crust	the thin, rocky outer layer of Earth, above the mantle
	mantle	the layer of rock between Earth's crust and core
SC 8.4.2.b Describe the physical composition of soil		
SC 8.4.2.c Describe the mixture of gasses in Earth's atmosphere and how the atmosphere's properties change at different elevations		
SC 8.4.2.d Describe evidence of Earth's magnetic field	magnetic field	a region where a magnetic force can be detected
SC 8.4.2.e Compare and contrast constructive and destructive forces (deposition, erosion, weathering, plate motion causing uplift, volcanoes, earthquakes) that impact Earth's surface	convergence	the process of moving closer together
	divergence	the process of moving farther apart
	tectonic plate	pieces of Earth's crust and uppermost mantle (together called the lithosphere) that cause changes in Earth's surface by their movements
SC 8.4.2.f Describe the rock cycle	igneous	rock that forms when magma cools and solidifies
	metamorphic	rock that forms from other rocks as a result of intense heat, pressure, or chemical processes
	sedimentary	rock that forms from the weathering and erosion of other rocks (these sediments are deposited, compacted, and cemented)

Grade 8		
Earth and Space Sciences		
<b>Earth Structures and Processes (con't)</b>	<b>SC 8.4.2 Students will investigate and describe Earth's structure, systems, and processes.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC 8.4.2.g Describe the water cycle (evaporation, condensation, precipitation)	precipitation	any form of water that falls to Earth's surface from the clouds; includes rain, snow, sleet, and hail
SC 8.4.2.h Classify Earth materials as renewable or nonrenewable	nonrenewable	a resource that is consumed much faster than the resource can be formed
	renewable	a resource that can be replaced at the same rate at which it is consumed
<b>Energy in Earth's Systems</b>	<b>SC 8.4.3 Students will investigate and describe energy in Earth's systems.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC 8.4.3.a Describe how energy from the Sun influences the atmosphere and provides energy for plant growth		
SC 8.4.3.b Identify factors that influence daily and seasonal changes on Earth (tilt of the Earth, humidity, air pressure, air masses)	air mass	a large body of air with similar temperature and moisture throughout
	air pressure	the force of the weight of air pushing on a surface
	humidity	the amount of water vapor in the air
SC 8.4.3.c Describe atmospheric movements that influence weather and climate (air masses, jet stream)	jet stream	a high speed wind current
<b>Earth's History</b>	<b>SC 8.4.4 Students will use evidence to draw conclusions about changes in Earth.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC 8.4.4.a Recognize that Earth processes we see today are similar to those that occurred in the past (uniformity of processes)		
SC 8.4.4.b Describe how environmental conditions have changed through use of the fossil record	fossil	any remains, impressions, or traces of a living thing found in Earth of a former geologic age

Grade 11		
Earth and Space Sciences		
<b>Earth in Space</b>	<b>SC12.4.1 Students will investigate and describe the known universe.</b>	
SC12.4.1.a Describe the formation of the universe using the Big Bang Theory	big bang	the prevailing theory that the universe began as one mass that then expanded into the state of the current universe
SC12.4.1.b Recognize that stars, like the Sun, transform matter into energy by nuclear reactions which leads to the formation of other elements	nuclear fusion	the process by which nuclei of small atoms combine to form a new, more massive nucleus during which energy is released
SC12.4.1.c Describe stellar evolution	stellar evolution	sequence of changes that occurs in a star as it age; this process is driven by gravity due to mass and pressure due to nuclear fusion
<b>Earth Structures and Processes</b>	<b>SC12.4.2 Students will investigate the relationships among Earth's structure, systems, and processes.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC12.4.2.a Recognize how Earth materials move through geochemical cycles (carbon, nitrogen, oxygen) resulting in chemical and physical changes in matter	geochemical cycles	the movement of elements between Earth's land, water, atmosphere, and living things
SC12.4.2.b Describe how heat convection in the mantle propels the plates comprising Earth's surface across the face of the globe (plate tectonics)	convection	heat transfer in a fluid by the circulation of currents due to differences in density
SC12.4.2.c Evaluate the impact of human activity and natural causes on Earth's resources (groundwater, rivers, land, fossil fuels)	conservation	the careful use of natural resources including preservation, protection, or restoration
	fossil fuels	a nonrenewable energy source from the remains of organisms from a former geologic age that can be used as fuel (examples include coal, oil, and natural gas)
	groundwater	water that is beneath Earth's surface
<b>Energy in Earth's Systems</b>	<b>SC12.4.3 Students will investigate and describe the relationships among the sources of energy and their efforts on Earth's systems.</b>	
<b>Curricular Indicator</b>	<b>Term</b>	<b>Definition</b>
SC12.4.3.a Describe how radiation, conduction, and convection transfer heat in Earth's systems	conduction	transfer of heat energy between heat substances that are in direct contact with one another
	radiation	heat energy transfer due to electromagnetic waves
SC12.4.3.b Identify internal and external sources of heat energy in Earth's systems		
SC12.4.3.c Compare and contrast benefits of renewable and nonrenewable energy sources		
SC12.4.3.d Describe natural influences (Earth's rotation, mountain ranges, oceans, differential heating) on global climate		

Grade 11		
Earth and Space Sciences		
Earth's History	SC12.4.4 Students will explain the history and evolution of Earth.	
Curricular Indicator	Term	Definition
SC12.4.4.a Recognize that in any sequence of sediments or rocks that has not been overturned, the youngest sediments or rocks are at the top of the sequence and the oldest are at the bottom (law of superposition)		
SC12.4.4.b Interpret Earth's history by observing rock sequences, using fossils to correlate the sequences at various locations, and using data from radioactive dating methods	fossil correlation	a determination of the relative age of rock layers reached by studying fossils
	radioactive dating	the method of calculating the absolute ages of rocks and minerals that contain radioactive isotopes
SC12.4.4.c Compare and contrast the physical and biological differences of the early Earth with the planet we live on today		