

Grade 6-8 Science Frameworks

STANDARD 1: STUDENTS UNDERSTAND THE PROCESSES OF SCIENTIFIC INVESTIGATION AND ARE ABLE TO DESIGN, CONDUCT, COMMUNICATE ABOUT, AND EVALUATE SUCH INVESTIGATIONS.

6 th Grade	7 th Grade	8 th Grade	Resources	Vocabulary
6(1)a	7(1)a	8(1)a		
<p>asks questions and state hypotheses that lead to different types of scientific investigations</p> <ul style="list-style-type: none"> tells what question they are going to answer or problems they are trying to solve by doing an investigation predicts what will happen and explains (e.g., "If...then...because.") knows what variables can impact their prediction 	<p>asks questions and states hypotheses leading to different types of scientific investigations</p> <ul style="list-style-type: none"> restates the question or describes the problem they are answering by doing an investigation (purpose) states a hypothesis and supports it based on prior experiences and/or science knowledge (e.g., "If...then...because...") identifies a single variable to guide the formation of a question explains why more supporting evidence results in better predictions recognizes the difference between a hypothesis and a prediction 	<p>asks questions and states hypotheses that leading to different types of scientific investigations</p> <ul style="list-style-type: none"> explains the difference between a hypothesis and a prediction recognizes questions that can be answered by various types of investigations (e.g., research, observation, controlled experiment, statistical analysis) considers multiple independent and dependent variables when stating a hypothesis 		<p><i>Science vocabulary for Grades 6-8 is based on the NWEA Continuum RIT Range of ??? to ??? and is in a continuous random list.</i></p> <p>chance, common, control, decrease, design experiment, diameter, formulate model, generalization, graduated cylinder, hold constant, increase, independent variable, interpret data, interval, investigate, justify, material, meter stick, pendulum, precision, quality, quantity, random group, reliable, scale (measurement), significant, statistics, texture, trial-and-error procedure, beaker, controlled experiment, dependent, orderly pattern, probable, quantitative, scientific evidence, testable, theorize, scientific, sense extender</p>
6(1)b	7(1)b	8(1)b		
<p>uses appropriate tools, technologies, and measurement units to gather and organize data</p> <ul style="list-style-type: none"> uses tools (e.g.: hand lens, thermometer, magnets, metric measuring devices-metric sticks, graduated cylinders, beakers, triple beam balance) typical of science to gather data uses drawings/models to illustrate and label key characteristics of an object or organism does multiple trials or observations when 	<p>uses appropriate tools, technologies, and measurement units to gather and organize data</p> <ul style="list-style-type: none"> uses tools (e.g.: microscopes, metric measuring devices-metric sticks, graduated cylinders, beakers, triple beam balance) typical of science to gather data uses drawings/models to illustrate key characteristics of objects, organisms, or observations does multiple trials or observations when 	<p>uses appropriate tools, technologies, and measurement units to gather and organize data</p> <ul style="list-style-type: none"> uses tools to gather data (e.g.: balances [mass/density], graduated cylinders [volume], pipettes, meter sticks [distance/area/volume], thermometer [temperature], volt meter [current]) uses drawings/models/ diagrams to illustrate and label key characteristics of objects, organisms, observations, or theories follows multiple-step written directions 		<p>accelerate, apparent size, balance (equilibrium), claim, contact, discard, disequilibrium, double-pan balance, evaluate, evolution, evolutionary change, evolutionary trend, evolve, field of view, geologist, magnification power, material, observable, orderly, percentage, physical model, predictable, regular increase, reject, reversible, scale model, scaled up absolute knowledge, balance, coincidence, cyclic, cyclic phenomenon, episodic, inconclusive, indicate, number pattern, phenomena, regulated, repeat, replication, results, testable, vary, cancellation, finding (scientific),</p>

<p>appropriate and explains the reason for doing so</p> <ul style="list-style-type: none"> • follows multiple-step written directions • finds mean (showing work) • sets up a bar or line graph labeling the axes with words and numbers when each axis is identified • answers questions and describes general trends using a their graph 	<p>appropriate and explains the reason for doing so</p> <ul style="list-style-type: none"> • follows multiple-step written directions • finds measurements of central tendency (mean, median, mode, range, etc.) using data • sets up a bar graph, histogram or line graph using collected data • constructs multiple visual representations of data then answers questions and describes general trends 	<ul style="list-style-type: none"> • uses quantitative as well as qualitative data when making observations • sets up, determines appropriate scale, and labels: histograms, bar, line, scatter plot and line of best fit graphs of individual and/or class data 		<p>invalid (data), opposing forces, principle, regular time interval, air resistance, atomic structure, carbon, chemical property, collide, column, compass, compass needle, compound machine, conduct, conductor, convect, convert, dense, distilled water,</p>
6(1)c	7(1)c	8(1)c		
<p>interprets and evaluates data in order to formulate conclusions</p> <ul style="list-style-type: none"> • states individual conclusions and describes general trends using representation of data • compares results with predictions and answers the question being investigated • uses evidence to generate explanations 	<p>interprets and evaluates data in order to formulate conclusions</p> <ul style="list-style-type: none"> • interprets and evaluates ranges and diversity of data • states individual conclusions and describes general trends using representation of data • compares results with hypothesis and answers the question being investigated • identifies variables that could cause results to differ from other trials or hypotheses 	<p>interprets and evaluates data in order to formulate conclusions</p> <ul style="list-style-type: none"> • states individual conclusions and describes general trends using multiple representations of data • identifies variables that could cause results to differ from other trials or hypotheses • compares results with hypothesis and identifies next steps and/or tests new ideas 		<p>electric current, filament, fluctuate, generator, glucose, gravitational attraction, hardness, inclined plane, insulation, insulator, kilowatt hour, kinetic, litmus paper, magnesium, material, mercury (element), m minimize, mixture, molecular motion, natural gas, neutral, Newton, parallel circuit,</p>
6(1)d	7(1)d	8(1)d		
<p>communicates results of investigations in appropriate ways</p> <ul style="list-style-type: none"> • shares results and explanations through written reports, graphic displays and oral presentations 	<p>communicates results of investigations in appropriate ways</p> <ul style="list-style-type: none"> • shares results and explanations through written reports, graphic displays and oral presentations 	<p>communicates results of investigations in appropriate ways</p> <ul style="list-style-type: none"> • shares results and explanations through written reports, graphic displays, and oral presentations (e.g., creates a technical research report and creates visual displays of their research) 		<p>percolating, physical union, pole, positively charged, prism, radiate, react, reaction, room temperature, seal level selenium, series circuit, silver, sound energy, spectrum, stationary, sugar sulfur/sulphur, texture, thermos jug, tin, transfer, turbine, vaporize, vertical row, vocal cords</p>
6(1)e	7(1)e	8(1)e		
<p>identifies and evaluates alternative explanations and procedures</p> <ul style="list-style-type: none"> • analyzes conclusions based on supporting evidence 	<p>identifies and evaluates alternative explanations and procedures</p> <ul style="list-style-type: none"> • compares historical and present day explanations of the properties and structure of matter, theories of inheritance, etc. 	<p>identifies and evaluates alternative explanations and procedures</p> <ul style="list-style-type: none"> • analyzes conclusions based on procedures used and supporting evidence available 		<p>acid rain, alpha particle, amplitude, area of influence, arm (parts of balance), atomic mass, atomic number, average atomic mass, balance, base (parts of balance), battery, boiling point, brake, centi-, change of phase, change of state, chemical bond, chemical change,</p>

	<ul style="list-style-type: none"> analyzes conclusions based on procedures used and supporting evidence provided 			chlorine, circuit tester, closed container, corrosion, current, dimmer (electrical) Dimitri Medeleev, dry cell battery, dry ice, effort, electrical shock, electrical wire
6(1)f	7(1)f	8(1)f		
<p>uses examples to demonstrate that scientific ideas are used to explain previous observations and to predict future events</p> <ul style="list-style-type: none"> explains how weather patterns can be used to predict weather events such as hurricanes, tornadoes, snowstorms, lightning, El Nino, etc. 	<p>uses examples to demonstrate that scientific ideas are used to explain previous observations and to predict future events</p> <ul style="list-style-type: none"> uses the particulate model of matter to explain and predict phenomena such as evaporation, conservation of mass, etc. uses the chromosome theory of inheritance to explain diversity of characteristics and predict some traits of offspring 	<p>uses examples to demonstrate that scientific ideas are used to explain previous observations and to predict future events</p> <ul style="list-style-type: none"> explains how the organization of the Periodic Table predicts and explains the physical and chemical properties of elements 		<p>electron affinity, explosion, first class lever, focal length, focal point, gear, helium,, illumination, infrared, intensity, isotope, lithium, long-range effect, mass number, measurable, melting point, milli-, negatively charged, nuclear explosion, nuclear power, nuclear reactor, pan (parts of balance), phase change, phenolphthalein, physical change, radiation, radioactive waster, reactor site, S.I. System, satellite, saturation point, solubility point, sublimate, transmission, ultraviolet, valence, visible spectrum, watt, wavelength</p>
6(1)g	7(1)g	8(1)g		
<p>creates a written plan for an investigation</p> <ul style="list-style-type: none"> designs a step-by-step procedure to answer a question and modifies as appropriate knows that variables should be considered when designing an investigation 	<p>creates a written plan for an investigation</p> <ul style="list-style-type: none"> defines and labels components of the scientific method (statements of problem, hypothesis, procedure [operational definition], observations, data table, results, conclusions) proposes possible ways to find the answer to a question being investigated (operational definitions) identifies variables in a described procedure 	<p>creates a written plan for an investigation</p> <ul style="list-style-type: none"> describes how to isolate/control variables designs controlled experiments rechecks hypothesis, writes conclusions based on observations 		<p>alternating circuit, basic, centrifugal force, charge, conservation of mass, decibel, electric, evacuate (container), grams, hertz, ionic, iron filings, joule, loudness, metal plate, neutralize, nuclear fission, overtone, pH, phosphorous, reaction force, sodium chloride, absorption, air pollution, air quality, algae, amphibious, animal cell, anus, arthropod, ATP, biome, birth rate, bladder, blue-green algae, body systems, carbon monoxide, cell membrane, change over time, chemical</p>
6(1)h	7(1)h	8(1)h		
<p>uses metric units in measuring, calculating, and reporting results</p> <ul style="list-style-type: none"> measures and estimates length, mass, and volume using cm, m, ml, g, etc. labels units 	<p>uses metric units in measuring, calculating, and reporting results</p> <ul style="list-style-type: none"> measures and estimates length, mass, and volume using mm, cm, m, ml, g, kg, etc. labels units 	<p>uses metric units in measuring, calculating, and reporting results</p> <ul style="list-style-type: none"> measures and estimates length, mass, and volume, and temperature using mm, cm, m, ml, g, kg, °C, etc. labels units 		<p>chlorophyll, circulate, commodity, community, complete metamorphosis, consume, crustacean, cytoplasm, death rate,</p>
6(1)i	7(1)i	8(1)i		
explains that scientific	explains that scientific	explains that scientific investigations		decompose, development, diet,

<p>investigations sometimes result in unexpected findings leading to new questions and more investigations</p> <ul style="list-style-type: none"> • generates questions during and after an investigation based on observations, data, or variables • revises models to accommodate new observations (e.g.: tectonic plates) 	<p>investigations sometimes result in unexpected findings leading to new questions and more investigations</p> <ul style="list-style-type: none"> • generates questions during and after an investigation based on observations, data, or variables • revises models to accommodate new observations (e.g.: genetics, particle theory) • redesigns experiment to test new ideas 	<p>sometimes result in unexpected findings leading to new questions and more investigations</p> <ul style="list-style-type: none"> • generates questions during and after an investigation based on observations, data, or variables • generates a new hypothesis based on collected data • redesigns experiment to test new hypotheses 		<p>digest, droplet, echinoderm, ecology, ecosystem, eliminate, embryo, evolution, excrete, exhale, fertilization, food pyramid (ecological), food supply, four-legged, fungi, generation, genetics, heart disease, hereditary information, heredity, inert, jellyfish, kidney, large intestine, life zone, liver, membrane, message migrate, mollusk, mushroom, native, niche, nitrogen dioxide, nuclear membrane, osmosis, ovary, overpopulate, overweight,</p>
6(1)j	7(1)j	8(1)j		
<p>gives examples of how collaboration can be useful in solving scientific problems and sharing findings</p> <ul style="list-style-type: none"> • explains how group thinking can improve scientific investigation 	<p>gives examples of how collaboration can be useful in solving scientific problems and sharing findings</p> <ul style="list-style-type: none"> • evaluates others' experiments to improve design 	<p>gives examples of how collaboration can be useful in solving scientific problems and sharing findings</p> <ul style="list-style-type: none"> • gives examples of how republication of research can result in more reliable and valid conclusions 		<p>paramecia, pest, photosynthesis, pistil, pollen, pollination, pollutant, prairie dog, red blood cell, regulate</p>

STANDARD 2: PHYSICAL SCIENCE: STUDENTS KNOW AND UNDERSTAND COMMON PROPERTIES, FORMS, AND CHANGES IN MATTER AND ENERGY. (FOCUS: PHYSICS AND CHEMISTRY)

2.1 Students know that matter has characteristic properties, which are related to its composition and structure

6 th Grade	7 th Grade	8 th Grade	Resources	Vocabulary
<p>6(2.1)a</p> <p>examines, describes, compares, measures, and classifies objects based on common physical and chemical properties</p> <ul style="list-style-type: none"> uses multiple characteristic properties to describe, compare, and/or identify substances (such as color, texture, density, hardness, luster, magnetism, etc.) of rock knows the four states of matter (solid, liquid, gas, plasma) 	<p>7(2.1)a</p> <p>examines, describes, compares, measures, and classifies objects based on common physical and chemical properties</p> <ul style="list-style-type: none"> uses multiple characteristic properties to describe, compare, classify and/or identify substances (viscosity, phase [solid, liquid, gas, plasma], mass, density, etc.) knows the density, boiling point, melting point, and freezing point of water 	<p>8(2.1)a</p> <p>examines, describes, compares, measures, and classifies objects based on common physical and chemical properties</p> <ul style="list-style-type: none"> uses multiple characteristic properties to describe, compare, and/or identify substances (such as pH, hardness, heat and electrical conductivity, solubility, reactivity, density, etc.) defines, measures, graphs, and compares boiling, melting and freezing points to classify and/or identify substances graphs and labels phase changes of a substance as it goes from solid, liquid to gas (or reverse) describes factors that affect density, boiling point, melting point, freezing point, solubility, pH, conductivity, etc. 		<p><i>Science vocabulary for Grades 6-8 is based on the NWEA Continuum RIT Range of ??? to ??? and is in a continuous random list.</i></p> <p>respiration, rodent, scale (skin), scales, skeletal system, skull, small intestine, smoking, social, source of energy, species, sperm, spore, stamen, succession, sugar, sulfur dioxide, symbiosis, synthesis, transport, trout, tube, umbilical cord, urinary bladder, uterus, vein, virus, web, yeast, yolk sac, anatomy, artery, arthropoda, atmospheric pollution, behavior, body fat, capillary, carbohydrate, catalyst, cellulose, centriole, chemical reaction, chromosome, cleavage, colony, conception, coniferous tree, conjugation, constitute, cross (genetic) duplicate, environmental condition, enzyme, excretory system, exoskeleton, external appendage, fat, fertilized, fin, flatworm, gastrulation, gene, gene frequency, gene pool, genetic material, genotype, gestation, implantation, infectious disease, crossing over, dominant,</p>
<p>6 (2.1)b</p> <p>separates mixtures of substances based on physical properties</p> <ul style="list-style-type: none"> separates mixtures into pure substances by using magnetic properties and/or densities 	<p>7 (2.1)b</p> <p>separates mixtures of substances based on physical properties</p> <ul style="list-style-type: none"> separates materials based on density (e.g.: using chromatography, density, columns, electrophoresis) uses and explains how fractional distillation can be 	<p>8 (2.1)b</p> <p>separates mixtures of substances based on physical properties</p> <ul style="list-style-type: none"> separates mixtures of substances by using characteristic properties (e.g., through filtration) 		<p>inherited, interphase, interrelationship, involuntary responses, lichen, lipids, live birth, lubricate, lymphatic system, meiosis, microorganism, mitosis, moisture, moss, mutation, natural resources, nucleic acid, nucleolus, oak, overcrowding, ovulation, ovule, phenotype, physical environment,</p>

	used to separate a mixture of liquids			pigment, plasma, plasma membrane, platelet, population growth, prehistoric, protoplasm, protozoa, reactant, recessive, recycling,
6 (2.1)c	7 (2.1)c	8 (2.1)c		
<p>classifies and describes matter in terms of elements, compounds, mixtures, atoms, and molecules</p> <ul style="list-style-type: none"> • knows the names of common elements (i.e., oxygen, hydrogen, carbon, nitrogen) • describes an element as being made up of very small, identical particles called atoms • knows that atoms consist of protons and neutrons in a nucleus with orbiting electrons • knows that atoms combine to form molecules and molecules make up compounds 	<p>classifies and describes matter in terms of elements, compounds, mixtures, atoms, and molecules</p> <ul style="list-style-type: none"> • knows that all substances on Earth are made up of different combinations of elements (of which there are about 100) • knows the names and cycles of elements especially important for life (e.g.: carbon, hydrogen, oxygen, and nitrogen) • compares and contrasts the definitions of elements, mixtures, and compounds and gives examples of each • recognizes that a compound has characteristic properties that are different from the properties of the substances from which it is made • recognizes the Periodic Table as a reference tool 	<p>classifies and describes matter in terms of elements, compounds, mixtures, atoms and molecules</p> <ul style="list-style-type: none"> • describes how atomic structure determines physical and chemical properties of an element • diagrams/models atomic structure including protons, neutrons, and electrons occurring in shells • identifies a substance as being either a compound or element depending on whether or not it can be broken down by electrolysis, heat, or adding acid • knows that some elements give off discrete particles (are radioactive) • explains how the organization of the Periodic Table describes and classifies elements 		<p>reduction division, renewable resource, section, selective breeding, sex, single-celled, sponge, starch, stigma, stinging cell, stress, synthesize, taxonomy, trait, white blood cell, xylem, (plant) cell wall, abiotic factor, additive, adrenalin, algal bloom, alternative energy source, amino acid, amoeba, artificial selection, axon, bacteria of decay, biologist, blood sugar level, brain, breeder, cellular structure, chitin, cilia, class, class (taxonomy), conservation biologist, conserve, Darwin, DDT, deletion, diffusion, electrochemical impulse, energy releasing process, estrogen, family, fermentation, flagella, follicle-stimulating hormone, genus, grassland, guard cell, holdfast, hormone, inorganic, insulin, inversion, kingdom, Leeuwenhoek, life span, Linnaeus, locomotion, natural selection, neuron</p>
6 (2.1)d	7 (2.1)d	8 (2.1)d		
<p>develops simple models to explain observed properties of matter</p> <ul style="list-style-type: none"> • creates models, based on evidence, to explain different patterns: <ol style="list-style-type: none"> 1) density water/oil 2) weather (hot/cold air density) 	<p>develops simple models to explain observed properties of matter</p> <ul style="list-style-type: none"> • uses the particulate nature of matter (particle model) to explain and illustrate observable phenomena such as: <ol style="list-style-type: none"> 1) phase changes (water cycle: freezing, melting, boiling points, and condensation) 2) diffusion of two liquids when mixed at various temperatures 3) volume of a solution 	<p>develops simple models to explain observed properties of matter</p> <ul style="list-style-type: none"> • uses the atomic model to explain and illustrate <ol style="list-style-type: none"> 1) density 2) phase changes 3) conservation of mass 4) equilibrium 		<p>neurotransmitter, pancreas, parahormone, Pasteur, phagocytosis, phototropism, pinocytosis, plasmodium, protein synthesis, protest, pseudopod, rate of entry, Schwann, specialization, specimen, stimulus, stomata, subdivision, substitution, substratum, synapse, translocation, transportation, vestigial structure, air pressure, angstrom, basalt, canyon, cavern, compaction, constellation, contract, crater, dam deposition, Earth's crust, ecological cycle, ellipse, equinox, expand, fault line, faulting, fission, float, folding, forecast, formation, fossil fuel, frost, full moon, funnel, fusion, gaseous,</p>

	<p>which can be less than the sum of the volumes of the solvent and solute</p> <p>4) conservation of mass</p>			<p>glaciations, glacier, greenhouse effect, igneous rock, landslide, light-year, marble, metamorphic rock, meteorite, meteorologist, new moon, nitrogen cycle, nova, oil well, parent material, porous rock, pumice, rainfall, relative age, rock cycle, rock layer, running water, salinity, sand dune, saturation, sea level, sediment, tidal wave, trace elements, uranium,</p>
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2.2 Students know that energy appears in different forms, and can move (be transferred) and change (be transformed).

6 (2.2)a	7 (2.2)a	8 (2.2)a		Vocabulary
		<p>measures quantities associated with energy forms</p> <ul style="list-style-type: none"> • makes quantitative observations (measurements) of different forms of energy • (i.e., temperature, current, resistance, velocity) 		<p><i>Science vocabulary for Grades 6-8 is based on the NWEA Continuum RIT Range of ??? to ??? and is in a continuous random list.</i></p> <p>vegetation, water pressure, well, wind speed, abyssal floor, abyssal plain, agent, air mass, amber, artesian well, ash, atoll, atomic energy, biomass, boundary, cirrus, cold front, continental margin, continental shelf, continental slope, cosmic rays, crystal plate, cyclone, deep-water zone, dehydrate, Earth process,</p>
6 (2.2)b	7 (2.2)b	8 (2.2)b		
<p>describes qualitative and quantitative relationships using data, observations, and graphs associated with energy transfer or energy transformation</p> <ul style="list-style-type: none"> • compares and contrasts renewable and nonrenewable resources 	<p>describes qualitative and quantitative relationships using data, observations, and graphs associated with energy transfer or energy transformation</p> <ul style="list-style-type: none"> • observes and describes how the quantity of a material influences the transfer of energy (e.g., length of string or volume of liquid vs. pitch of sound) • diagrams the cycling and distribution of energy through a system (e.g., food web, energy pyramid) • recognizes the conversion of solar energy to chemical energy through 	<p>describes qualitative and quantitative relationships using data, observations and graphs associated with energy transfer or energy transformation</p> <ul style="list-style-type: none"> • observes and describes energy changes in exothermic and endothermic reactions • observes, measures, and graphs acceleration • demonstrates the mechanical advantage of levers, pulleys, and inclined planes • explains the law of conservation of energy 		<p>electrical field, erode, eye of a hurricane, fair (weather), falling star, fault, fault zone, fixed orbit, frequency, front, geyser, ground water, Halley's comet, humid, hurricane, igneous, inner core, mercury barometer, mercury thermometer, meteoroid, mid-ocean ridge, Milky Way Galaxy, mudstone, NASA, nonrenewable, Northern revolution, petrified wood, petroleum, plains, plant matter, plate, preserve, reef, region, renewable, renewable energy, renewable source, replacement, rift valley, San Andreas fault, sandstone, satellite, sea floor, seamount, seawater, sedimentary, shale, . Shallow-water zone, shore,</p>

	photosynthesis carbon/oxygen cycle, word equations showing energy input or release			spectroscope, submerge, tectonic plate, tidal, tidal forces, tide action, trench, undisturbed, valley, warm front, white dwarf
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2.3 Students understand that interactions can produce changes in a system, although the total quantities of matter and energy remain unchanged

6 (2.3)a	7 (2.3)a	8 (2.3)a		Vocabulary
identifies and classifies factors causing change within a system (such as weather and ecological systems) <ul style="list-style-type: none"> analyzes weather systems to identify factors (such as solar energy, mass, composition, plate tectonics, [convection] etc.) causing change analyzes ecological systems to identify factors (such as recycling, consumption, emissions, etc.) causing change 	identifies and classifies factors causing change within a system <ul style="list-style-type: none"> analyzes ecological systems to identify factors (such as population dynamics, light, temperature, photosynthesis, etc.) causing change 	identifies and classifies factors causing change within a system <ul style="list-style-type: none"> analyzes temperature systems to identify factors causing change (such as convection, radiation, conduction, current, etc.) analyzes atmospheric systems to identify factors (such as gas emissions, deforestation, etc.) causing change (such as the greenhouse effect) 		<i>Science vocabulary for Grades 6-8 is based on the NWEA Continuum RIT Range of ??? to ??? and is in a continuous random list.</i> aquifer, asteroid belt, breccias, convergent plate boundary, cover crop, cumulus, delta, divergent plate boundary, embed, erupt, extrusive, flow, fracture, gold, hydroelectric power, location, lowland, metallic, methane, Milky Way, nimbus, oceanic crust, oil deposit, rock face, runoff, seashell, separate, settle, sift, Solar power, star cluster, stratus, streak (test), subduction boundary, subsoil, surface wind, thunderhead, tidal power, volcanic action
6 (2.3)b	7 (2.3)b	8 (2.3)b		
	identifies and predicts what will change and what will remain unchanged when matter experiences and external force or energy change <ul style="list-style-type: none"> describes movement of particles during the heating and cooling of materials (e.g.: water cycle, movement of dye in solutions of different temperatures, etc.) predicts changes in volume and suggest observations/measurements that would verify conservation of mass during phase changes (solid to liquid to gas) 	identifies and predicts what will change and what will remain unchanged when matter experiences and external force or energy change <ul style="list-style-type: none"> provides evidence of conservation of mass (e.g.: volume/mass of gasses in different containers, changes in state [solid to liquid to gas]) 		

<p>6 (2.3)c</p> <p>observes and gathers data to support the concept of the conservation of mass within a closed system</p> <ul style="list-style-type: none"> measures the mass of a quantity of water and a quantity of salt combines the two substances and evaporates to dryness mass the residue explain 	<p>7 (2.3)c</p> <p>observes and gathers data to support the concept of the conservation of mass within a closed system</p> <ul style="list-style-type: none"> gives examples of where the law of conservation of mass applies in life sciences (e.g. carbon/oxygen cycle, nitrogen cycle, food/energy pyramids) 	<p>8 (2.3)c</p> <p>observes and gathers data to support the concept of the conservation of mass within a closed system</p> <ul style="list-style-type: none"> distinguishes between a closed and open system explains what is meant by the term "conservation of mass" and why it is an important scientific concept provides evidence to show the conservation of mass although phases may change or new substances form 		
<p>6 (2.3)d</p> <p>describes, measures, and calculates quantities before and after a chemical or physical change within a system</p>	<p>7 (2.3)d</p> <p>describes, measures, and calculates quantities before and after a chemical or physical change within a system</p> <ul style="list-style-type: none"> describes changes (such as temperature, mass, volume) when matter undergoes a physical chemical change describes what happens to the particles of a substance/object when it apparently changes (e.g.: a candle burns, droplets appear on the outside of a glass) 	<p>8 (2.3)d</p> <p>describes, measures and calculates quantities before and after a chemical or physical change within a system</p> <ul style="list-style-type: none"> measures the changes (such as elevation or depression of freezing point or boiling point, and volume) when matter undergoes a physical or chemical change explains what happens to the mass of a substance/ object when it apparently changes (e.g.: a candle burns, droplets appear on the outside of a glass) 		
<p>6 (2.3)e</p> <p>identifies characteristics of moving objects and their interactions within a system</p> <ul style="list-style-type: none"> identifies and measures quantities that characterize moving objects (e.g.: force, velocity, acceleration, potential and kinetic energy) 	<p>7 (2.3)e</p>	<p>8 (2.3)e</p> <p>describes, measures (e.g. time, distance, mass, force) and calculates quantities that characterize moving objects and their interactions within a system</p> <ul style="list-style-type: none"> measures time and distance for objects that are moving to calculate force, velocity, acceleration, etc. 		

STANDARD 3: LIFE SCIENCE: STUDENTS KNOW AND UNDERSTAND THE CHARACTERISTICS AND STRUCTURE OF LIVING THINGS, THE PROCESSES OF LIFE, AND HOW LIVING THINGS INTERACT WITH EACH OTHER AND THEIR ENVIRONMENT.

3.1 Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with their environment.

6 th Grade	7 th Grade	8 th Grade	Resources
6 (3.1)a	7 (3.1)a	8 (3.1)a	
<p>creates and uses classification systems based on the structure of organisms</p> <ul style="list-style-type: none"> lists observable physical characteristics of a plant and/or animal that could be useful for identification selects and uses one characteristic to sort a group of plants or animals 			<p style="text-align: center;"><u>Signs and Symbols</u></p> <p>G gram ml milliliter (-) negative Sec second a.m. ' foot " inch p.m. % (.): decimal point ft. foot km kilometer cm cubic centimeter C₆H₁₂O₆ glucose Ca Calcium C Carbon CO Carbon monoxide H₂O Water H Hydrogen O Oxygen S Sulfur Co Cobalt Cr Chromium Cs Cesium Kg kilogram mL milliliter</p>
6 (3.1)b	7 (3.1)b	8 (3.1)b	
		<p>describes the importance of plant and animal adaptations</p> <ul style="list-style-type: none"> explains how a physical and/or behavioral adaptation of an organism might be important for its survival (such as symbiosis, predatory/prey interactions, 	<p>G grams - negative pH → flow of energy (food chain) Cl Chlorine Cu Copper</p>

		reproductive advantages, filling an ecological niche, etc.) <ul style="list-style-type: none"> describes and gives examples of situations that may lead to extinctions of species (defined as total elimination from our planet) 		K Na NO ₃ →	Potassium Sodium Nitrate leads to (geochemical cycle)
6 (3.1)c	7 (3.1)c	8 (3.1)c			
creates and interprets food chains and food webs <ul style="list-style-type: none"> interprets, compares and contrasts information found in food chains and food webs explains a food web that includes producers, consumers and decomposers, based on information about the plants and animals in an ecosystem 	creates and interprets food chains and food webs <ul style="list-style-type: none"> reviews a food web that includes producers, consumers and decomposers 				
6 (3.1)d	7 (3.1)d	8 (3.1)d			
		explains the interaction and interdependence of living and nonliving components within ecosystems <ul style="list-style-type: none"> names examples of nonliving components of an ecosystem (e.g.: soil, water, air, trash, minerals, sunlight, weather, etc.) explains how one of the nonliving characteristics of the local environment has affected the types of plants and animals that live here 			
6 (3.1)e	7 (3.1)e	8 (3.1)e			
describes how a population's requirements for food, water, space, and essential nutrients place limitations on the environment's ability to support populations <ul style="list-style-type: none"> explains what is meant by carrying capacity of ecosystems lists several factors that could limit the size of a plant or animal population 	describes how a population's requirements for food, water, space, and essential nutrients place limitations on the environment's ability to support populations <ul style="list-style-type: none"> uses examples to describe environmental factors that can change and may limit the population of a particular species (e.g., humans, food sources, nutrients, soil quality, climate, space, etc.) 				

3.2 Students know and understand interrelationships of matter and energy in living systems.

<p>6 (3.2)a</p> <p>describes the basic processes of photosynthesis and respiration and their importance to life</p> <ul style="list-style-type: none"> • compares and contrasts the processes of photosynthesis and respiration • knows that plant cells use the carbon in carbon dioxide as their source of matter to produce all parts of the plant • explains the relationship between the needs of a plant (air, light, water, and the right environmental conditions) and the raw materials of photosynthesis ($\text{CO}_2 + \text{H}_2\text{O} = \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$) and reverse 	<p>7 (3.2)a</p> <p>describes the basic processes of photosynthesis and respiration and their importance to life</p> <ul style="list-style-type: none"> • explains the difference between photosynthesis and respiration • relates photosynthesis and respiration to the appropriate cellular organelles (chloroplasts and mitochondria) • knows that when cells metabolize food, some of the carbon is released as carbon dioxide 	<p>8 (3.2)a</p>		
<p>6 (3.2)b</p>	<p>7 (3.2)b</p>	<p>8 (3.2)b</p>		
		<p>compares and contrasts food webs within and between ecosystems and predicts the consequences of disrupting one of the organisms in a food web</p>		
<p>6 (3.2)c</p> <p>describes ways that organisms get food and other matter to their cells</p> <ul style="list-style-type: none"> • explains the processes that allows transport of materials across cell membranes (such as diffusion, osmosis, active transport) • identifies capillaries as being where nutrients and gases are exchanged between cells and the blood • describes the role of digestive, respiratory, and 	<p>7 (3.2)c</p>	<p>8 (3.2)c</p>		

<p>circulatory systems in getting food, water, and oxygen to cells</p> <ul style="list-style-type: none"> • compares how these three systems work in humans with that of other animals 				
6 (3.2)d	7 (3.2)d	8 (3.2)d		
<p>explains the recycling of materials by determining a pathway for substances important to life</p> <ul style="list-style-type: none"> • relates the water cycle to its importance in sustaining life • explains what is meant by the term decomposition and how the appearance of an object changes as it decomposes • lists examples of organisms that play a role in decomposition 				

3.3 Students know and understand how the human body functions, factors that influence its structures and functions, and how these structures and functions compare with those of other organisms

6 (3.3)a	7 (3.3)a	8 (3.3)a		
<p>describes the observable components and functions of a cell</p> <ul style="list-style-type: none"> • discusses how all living things are made up of cells (this is one way to distinguish living from nonliving) 	<p>describes the observable components and functions of a cell</p> <ul style="list-style-type: none"> • explains that all living things are made up of cells • identifies and describes the major function of cell organelles (cell membrane, cell wall, nucleus, cytoplasm, chloroplasts, and mitochondria) • lists several functions of cells, including functions of specialized cells • provides evidence that some things can pass through a cell membrane (through osmosis/diffusion and active transport) 	<p>describes the observable components and functions of a cell</p> <ul style="list-style-type: none"> • reviews cell structure, function, and methods of material transport across cell membranes (osmosis, diffusion, and active transport) 		

6 (3.3)b	7 (3.3)b	8 (3.3)b		
	describes the growth and development of selected organism	describes the growth and development of selected organisms		
6 (3.3)c	7 (3.3)c	8 (3.3)c		
compares and contrasts the basic structures and functions of different types of cells <ul style="list-style-type: none"> • lists ways that plant cells generally differ from animal cells and explains the reason for these differences 	compares and contrasts the basic structures and functions of different types of cells <ul style="list-style-type: none"> • explains how general shapes of specialized cell types (muscle, nerve, red blood cell, sperm, egg, bone) correlate with its function • describes how the genetic content of a sex cell differs from that in a body cell of the same organisms • uses microscopes, images of microscopic views, and simulations of cellular activity to compare and contrast the basic structures and functions of different cell types (e.g.: view, sketch and compare onion cells, cheek cells, etc.) 			
6 (3.3)d	7 (3.3)d	8 (3.3)d		
identifies structures and functions of human body systems <ul style="list-style-type: none"> • Nervous: describes the path nerve impulses take throughout the body • identifies different types of nerves • Circulatory: describes the path of blood throughout the body • identifies different types of blood vessels • Respiratory: describes the path of oxygen through the body • identifies the parts of the respiratory system • Digestive: describes the path of food through the body • identifies the parts of the 	describes the structures and functions of human body systems <ul style="list-style-type: none"> • names the main organs that make up the skeletal, muscular, circulatory, nervous, and immune systems (and recall the names of the main organs that make up the digestive, respiratory, and reproductive systems) • creates a visual that shows the relationship between cells, tissues, organs, and systems • explains how the structure of a particular organ reflects its function • provides several examples of ways that body systems interact 	describes the structures and functions of human body systems <ul style="list-style-type: none"> • reviews reproductive system (sperm, egg, testes, ovaries) related to their role in sex cell production 		

digestive system • Excretory: describes how the kidneys, lungs, and digestive system aid the body in excretion				
6 (3.3)e	7 (3.3)e	8 (3.3)e		
		Compares the difference between non-communicable diseases and communicable diseases		

3.4 Students know and understand how organisms change over time in terms of biological evolution and genetics

6 (3.4)a	7 (3.4)a	8 (3.4)a		
describes the purpose and process of body cell division and sex cell division • identifies several tissues where body cell division (mitosis) takes place (such as skin, bone marrow, muscle tissue, cambium, meristems, etc.) and why this process is important • identifies the difference between mitosis and meiosis	describes the purpose and process of body cell division and sex cell division • describes several tissues where body cell division (mitosis) takes place (such as skin, bone marrow, muscle tissue, cambium, meristems, etc.) and why this process is important • defines, then compares and contrasts the phases, locations, and purposes of mitosis and meiosis			
6 (3.4)b	7 (3.4)b	8 (3.4)b		
describes the role of chromosomes, genes and DNA in heredity	describes the role of chromosomes, genes and DNA in heredity • draws or uses a model to show the relationship between cells, chromosomes, DNA and genes • identifies several inherited traits • recognizes and demonstrates the inheritance patterns of dominant and recessive genes • traces traits through a family tree • creates a simple pedigree/family tree • uses Punnet squares to			

	<p>predict the probability of possible outcomes (including gender) when the parents' gene pairs are known</p> <ul style="list-style-type: none"> • uses an example to explain why it is possible for an offspring to look different from either parent for a particular trait • explains how mutations occur and gives examples of the impact they can have on the traits of organisms 			
6 (3.4)c	7 (3.4)c	8 (3.4)c		
		<p>describes evidence that reveals changes in groups of organisms over geological time</p> <ul style="list-style-type: none"> • discusses several organisms that once lived on Earth that are now extinct • compares and contrasts similar body systems in species from phyla to phyla 		

STANDARD 4: EARTH AND SPACE SCIENCE: STUDENTS KNOW AND UNDERSTAND THE PROCESSES AND INTERACTIONS OF EARTH’S SYSTEMS AND THE STRUCTURE AND DYNAMICS OF EARTH AND OTHER OBJECTS IN SPACE.

4.1 Students know and understand the composition of Earth, its history, and the natural processes that shape it

6 (4.1)A	7 (4.1)a	8 (4.1)a	Resources	
<p>explains how minerals, rocks, and soils form</p> <ul style="list-style-type: none"> names the three groups of rocks (igneous, sedimentary, metamorphic) and give examples of each observes the characteristics of a rock to identify it as igneous, sedimentary or metamorphic 	<p>explains how minerals, rocks, and soils form</p> <ul style="list-style-type: none"> reviews the three groups of rocks describes the characteristics of a rock to identify it as igneous, sedimentary or metamorphic observes, describes, and identifies minerals (e.g.: quartz, pyrite, magnetite) based on their characteristic properties (hardness, streak, color, luster, etc.) draws/diagrams/models the rock cycle describes processes that create rocks and soil 	<p>explains how minerals, rocks, and soil form</p> <ul style="list-style-type: none"> uses the particulate nature of matter to explain the characteristic properties of materials such as rocks, minerals, and soils reviews and explains the rock cycle as it relates to the fossil record 		
6 (4.1)b	7 (4.1)b	8 (4.1)b		
	<p>explains how fossils and their location within the Earth indicate that life has changed through time</p> <ul style="list-style-type: none"> describes several ways that fossils can form uses an example to describe how fossils can be used for evidence that environmental conditions were different in the past than they are now explains why fossils are more likely to be found in sedimentary rocks than in igneous or metamorphic 			
6 (4.1) c	7 (4.1)c	8 (4.1)c		
		<p>explains natural processes that shape Earth’s surface</p> <ul style="list-style-type: none"> explains the theory of plate tectonics and describes the 		

		evidence used to support it <ul style="list-style-type: none"> describes events that result in the wearing down of Earth's surface (such as weathering, erosion, etc.) draws/diagrams/models events that can result in building up of Earth's surface (i.e., seismic or volcanic activity, plate movement, rock cycle) 		
6 (4.1)d	7 (4.1)d	8 (4.1)d		
explains the distribution and causes of natural events <ul style="list-style-type: none"> describes the main characteristics of the crust, mantle and core explains the relationship between magma, minerals, and igneous rocks		explains the distribution and causes of natural events <ul style="list-style-type: none"> sketches and labels a cross section of Earth explains why earthquakes and volcanoes occur along plate boundaries identifies places on a map where volcanoes and earthquakes, or hurricanes and tornadoes are most likely to occur 		

4.2 Students know and understand the general characteristics of the atmosphere and fundamental processes of weather

6 (4.2)a	7 (4.2)a	8 (4.2)a	Resources	
	explains how atmospheric circulation is driven by solar heating <ul style="list-style-type: none"> explains how the speed of particle movement relates to temperature and density and how this affects movement of atmospheric gases 	explains how atmospheric circulation is driven by solar heating <ul style="list-style-type: none"> understands the transfer of energy by radiation, convection, conduction uses a model to show how water and land surfaces heat differently thus producing wind describes the general pattern of how temperature changes over 24 hours explains (using words or drawings) why the polar regions receive less solar energy than the equator knows that the Sun is the source of energy that heats air masses which results in the movement of these masses 		
6 (4.2)b	7 (4.2)b	8 (4.2)b		
observes, measures, and	observes, measures, and			

records changes in weather conditions <ul style="list-style-type: none"> observes and records changes in weather indicators such as humidity, temperature, air pressure, cloud types, wind, precipitation 	records changes in weather conditions <ul style="list-style-type: none"> plots weather data on a bar or line graph and uses it to describe weather changes over time 			
6 (4.2)c	7 (4.2)c	8 (4.2)c		
	describes the basic composition, properties, and structure of the atmosphere <ul style="list-style-type: none"> illustrates, labels, and distinguishes the strata of the atmosphere (e.g.: troposphere, stratosphere, etc.) 	describes the basic composition, properties, and structure of the atmosphere <ul style="list-style-type: none"> lists the components of the atmosphere (gases, water, dust particles, pollutants) describes temperature and pressure distribution within the Earth's atmosphere 		
6 (4.2)d	7 (4.2)d	8 (4.2)d		
identifies large-scale and local weather fronts <ul style="list-style-type: none"> fronts air masses storms 		identifies large-scale and local weather fronts <ul style="list-style-type: none"> describes and explains how oceans, latitude, and elevation affect local weather conditions 		
6 (4.2)e	7 (4.2)e	8 (4.2)e		
		discusses factors that may influence weather and climate (e.g.: proximity to oceans, prevailing winds, fossil fuel burning, volcanic eruptions)		

4.3 Students know major sources of water, its uses, importance, and cyclic patterns of movement through the environment

6 (4.3)a	7 (4.3)a	8 (4.3)a	Resources	
		discusses the distribution and circulation of the world's water through oceans, glaciers, rivers, groundwater, and atmosphere		
6 (4.3)b	7 (4.3)b	8 (4.2)b		
investigates and compares the properties and behavior of water in its solid, liquid and gaseous states <ul style="list-style-type: none"> reviews water cycle 	investigates and compares the properties and behavior of water in its solid, liquid and gaseous states <ul style="list-style-type: none"> knows that water serves as the standard for metric units (1 gram = 1 cubic cm = 1 			

	ml) <ul style="list-style-type: none"> compares and contrasts the speed and movement of particles within different phases of water 			
6 (4.3)c	7 (4.3)c	8 (4.3)c		
	describes the composition and physical characteristics of oceans <ul style="list-style-type: none"> reviews the characteristics of oceans through unique features (such as current, waves, salinity, ridges, trenches) 			

4.4 Students know the structure of the solar system, composition and interactions of objects in the universe, and how space is explored

6 (4.4)a	7 (4.4)a	8 (4.4)a	Resources	
explains the effects of relative motion and position of the Sun, Earth, and Moon <ul style="list-style-type: none"> draws a sketch or uses a model to explain a day and a year explains the tilt of Earth on its axis is the cause of seasons sequences pictures of the phases of the Moon and explains why the Moon appears to change shape draws a sketch to show the position of the Sun, Earth, and Moon to explain the new and full Moons makes sketches to explain solar and lunar eclipses explains how gravity affects the movement of the Sun, Earth, and Moon 	explains the effects of relative motion and position of the Sun, Earth, and Moon			
6 (4.4)b	7 (4.4)b	8 (4.4)b		
Compares Earth to other planets <ul style="list-style-type: none"> uses models of planets to compare size and diameter 	compares Earth to other planets <ul style="list-style-type: none"> names the planets in order from the Sun compares, contrasts, and 			

	<p>identifies planets in our solar system by several characteristics (such as size, composition, habitability, etc.)</p> <ul style="list-style-type: none"> • shows the relative distances between planets when given a scale to use • compares and contrasts the chemistry of terrestrial and gaseous planets • compares the chemistry of stars to that of the planets 			
6 (4.4)c	7 (4.4)c	8 (4.4)c	Resources	
		<p>identifies technology required to explore space</p> <ul style="list-style-type: none"> • names tools used to explore space (such as telescopes, spectroscopes, lunar module, rover, shuttle, etc.) and tells what each is used for 		
6 (4.4)d	7 (4.4)d	8 (4.4)d		
	<p>reviews the basic components, composition, size, and theories of origin of the solar system</p> <ul style="list-style-type: none"> • summarizes the Big Bang Theory and discusses evidence used to support it • summarizes the Dust Cloud Theory and discusses evidence used to support it • describes the phenomena of black holes 	<p>describes the basic components, composition, and size of the solar system</p> <ul style="list-style-type: none"> • describes the parts of the solar system (planets, Sun, meteors, comets, etc.) • explains how the parts of the solar system interact • compares and contrasts the features and composition of the Moon with that of the Earth • explains the relationship between our solar system, a galaxy, and the universe 		

STANDARD 5: STUDENTS UNDERSTAND THAT THE NATURE OF SCIENCE INVOLVES A PARTICULAR WAY OF BUILDING KNOWLEDGE AND MAKING MEANING OF THE NATURAL WORLD.

6 (5.1)	7 (5.1)	8 (5.1)	Resources	
demonstrates understanding that a controlled experiment must have comparable results when repeated	demonstrates understanding that a controlled experiment must have comparable results when repeated	demonstrates understanding that a controlled experiment must have comparable results when repeated		
6 (5.2)	7 (5.2)	8 (5.2)		

demonstrate that scientific knowledge changes as new knowledge is acquired and previous ideas are modified (e.g.: through space exploration)	demonstrate that scientific knowledge changes as new knowledge is acquired and previous ideas are modified (e.g.: through space exploration)	demonstrate that scientific knowledge changes as new knowledge is acquired and previous ideas are modified (e.g.: through space exploration)		
6 (5.3)	7 (5.3)	8 (5.3)		
demonstrates that contributions to the advancement of science have been made by people in different cultures and at different times in history	demonstrates that contributions to the advancement of science have been made by people in different cultures and at different times in history	demonstrates that contributions to the advancement of science have been made by people in different cultures and at different times in history		
6 (5.4)	7 (5.4)	8 (5.4)		
demonstrates that models can be used to predict change (e.g.: computer simulation, video sequence, stream table)	demonstrates that models can be used to predict change (e.g.: computer simulation, video sequence, stream table)	demonstrates that models can be used to predict change (e.g.: computer simulation, video sequence, stream table)		
6 (5.5)	7 (5.5)	8 (5.5)		
demonstrates that there are interrelationships among science, technology and human activity that affect the world	demonstrates that there are interrelationships among science, technology and human activity that affect the world	demonstrates that there are interrelationships among science, technology and human activity that affect the world		