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Grade 6	Grade 7	Grade 8	IPC	Biology	Chemistry	Physics
(1) Scientific investigation and reasoning. The student, for at least 40% of instructional time, conducts laboratory and field investigations following safety procedures and environmentally appropriate and ethical practices. The student is expected to:	*(1) Scientific investigation and reasoning. The student, for at least 40% of the instructional time, conducts laboratory and field investigations following safety procedures and environmentally appropriate and ethical practices. The student is expected to:*	*(1) Scientific investigation and reasoning. The student, for at least 40% of instructional time, conducts laboratory and field investigations following safety procedures and environmentally appropriate and ethical practices. The student is expected to:*	*(1) Scientific processes. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:*	*(1) Scientific processes. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:*	*(1) Scientific processes. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:*	*(1) Scientific processes. The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:*
1.A Demonstrate safe practices during laboratory and field investigations as outlined in Texas Education Agency-approved safety standards.	**1.A** Demonstrate safe practices during laboratory and field investigations as outlined in Texas Education Agency-approved safety standards.	**1.A** Demonstrate safe practices during laboratory and field investigations as outlined in Texas Education Agency-approved safety standards.	**1.A** Demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles or chemical splash goggles, as appropriate, and fire extinguishers.	**1.A** Demonstrates safe practices during laboratory and field investigations.	**1.A** Demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles or chemical splash goggles, as appropriate, and fire extinguishers.	**1.A** Demonstrates safe practices during laboratory and field investigations.
			1.B Know specific hazards of chemical substances such as flammability, corrosiveness and radioactivity as summarized on the Safety Data Sheets (SDS).		**1.B** Know specific hazards of chemical substances such as flammability, corrosiveness and radioactivity as summarized on the Safety Data Sheets (SDS).	
1.B Practice appropriate use and conservation of resources including disposal, reuse, or recycling of materials.	**1.B** Practice appropriate use and conservation of resources including disposal, reuse, or recycling of materials.	**1.B** Practice appropriate use and conservation of resources including disposal, reuse, or recycling of materials.	**1.C** Demonstrate an understanding of the use and conservation of resources and the proper	**1.B** Demonstrate an understanding of the use and conservation of resources and	**1.C** Demonstrate an understanding of the use and conservation of resources	**1.B** Demonstrate an understanding of the use and conservation of resources and the proper

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			disposal or recycling of materials.	the proper disposal or recycling of materials.	and the proper disposal or recycling of materials.	disposal or recycling of materials.
(2) Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations. The student is expected to:	*(2) Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations. The student is expected to:*	*(2) Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations. The student is expected to:*	*(2) Scientific processes. The student uses scientific practices during laboratory and field investigations. The student is expected to:*	*(2) Scientific processes. The student uses scientific practices and equipment during laboratory and field investigations. The student is expected to:*	*(2) Scientific processes. The student uses scientific practices to solve investigative questions. The student is expected to:*	*(2) Scientific processes. The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:*
			2.A Know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section.	**2.A** Know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section.	**2.A** Know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section.	**2.A** Know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section.
				2.B Know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories.	**2.B** Know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories.	**2.B** Know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence.
				2.C Know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas or science and new technologies are developed.	**2.C** Know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas or science and new technologies are developed.	**2.C** Know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change.

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Grade 6	*Grade 7*	*Grade 8*	*IPC*	*Biology*	*Chemistry*	*Physics*
				2.D Distinguish between scientific hypotheses and scientific theories.	**2.D** Distinguish between scientific hypotheses and scientific theories.	
2.A Plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and selecting and using appropriate equipment and technology.	**2.A** Plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and selecting and using appropriate equipment and technology.	**2.A** Plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and selecting and using appropriate equipment and technology.	**2.B** Plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology.	**2.E** Plan and implement descriptive, comparative and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology.	**2.E** Plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology; including graphing calculators, computers and probes, electronic balances, an adequate supply of consumable chemicals, and sufficient scientific glassware such as beakers, Erlenmeyer flasks, pipettes, graduated cylinders, volumetric flasks, and burettes.	**2.D** Design and implement investigative procedures including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness, and identifying causes and effects of uncertainties in measured data.
2.B Design and implement experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology.	**2.B** Design and implement experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology.	**2.B** Design and implement experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses and selecting and using appropriate equipment and technology.				
2.C Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.	**2.C** Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.	**2.C** Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.	**2.C** Collect data and make measurements with accuracy and precision.	**2.F** Collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as data-collecting probes, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, balances, gel electrophoresis apparatuses, micropipettes, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams or samples of biological specimens or structures.	**2.F** Collect data and make measurements with accuracy and precision.	**2.G** Make measurements with accuracy and precision and record data using scientific notation and International System (SI) units.

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					2.G Express and manipulate chemical quantities using scientific conventions and mathematical procedures including dimensional analysis, scientific notation, and significant figures.	**3.E** Express, manipulate, and interpret relationships symbolically in accordance with accepted theories to make predictions and solve problems mathematically.
2.D Construct tables and graphs, using repeated trials and means, to organize data and identify patterns.	**2.D** Construct tables and graphs, using repeated trials and means, to organize data and identify patterns.	**2.D** Construct tables and graphs, using repeated trials and means, to organize data and identify patterns.				**2.H** Organize, evaluate, and make inferences from data and make inferences from data including the use of tables, charts, and graphs.
2.E Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.	**2.E** Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.	**2.E** Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.	**2.D** Organize, analyze, evaluate, make inferences, and predict trends from data.	**2.G** Analyze, evaluate, make inferences, and predict trends from data.	**2.H** Organize, analyze, evaluate, make inferences, and predict trends from data.	
			2.E Communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphs, journals, summaries, oral reports, and technology-based reports.	**2.H** Communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology based reports.	**2.I** Communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphs, journals, summaries, oral reports and technology-based reports.	**2.I** Communicate valid conclusions supported by the data through various methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.
(3) Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:	*(3) Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:*	*(3) Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:*	*(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions. The student is expected to:*	*(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:*	*(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:*	*(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:*
3.A Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning and experimental and observational testing, so as to encourage critical thinking by the student.	**3.A** Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning and experimental and observational testing, so as to encourage critical thinking by the student.	**3.A** Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning and experimental and observational testing, so as to encourage critical thinking by the student.	**3.A** Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning and experimental and observational testing, so as to encourage critical thinking by the student.	**3.A** Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning and experimental and observational testing, so as to encourage critical thinking by the student.	**3.A** Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning and experimental and observational testing, so as to encourage critical thinking by the student.	**3.A** Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning and experimental and observational testing, so as to encourage critical thinking by the student.

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Grade 6	*Grade 7*	*Grade 8*	*IPC*	*Biology*	*Chemistry*	*Physics*
			3.B Communicate and apply scientific information extracted from various sources such as current events, published journal articles and marketing materials.	**3.B** Communicate and apply scientific information extracted from various sources such as current events, published journal articles and marketing materials.	**3.B** Communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles and marketing materials.	**3.B** Communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles and marketing materials.
			3.C Draw inferences based on data related to promotional materials for products and services.	**3.C** Draw inferences based on data related to promotional materials for products and services.	**3.C** Draw inferences based on data related to promotional materials for products and services.	
3.B Use models to represent aspects of the natural world such as a model of Earth's layers.	**3.B** Use models to represent aspects of the natural world such as human body systems, and plant and animal cells.	**3.B** Use models to represent aspects of the natural world such as an atom, a molecule, space or a geologic feature.		**3.E** Evaluate models according to their limitations in representing biological objects or events.		
3.C Identify advantages and limitations of models such as size, scale, properties, and materials.	**3.C** Identify advantages and limitations of models such as size, scale, properties, and materials.	**3.C** Identify advantages and limitations of models such as size, scale, properties, and materials.				
3.D Relate the impact of research on scientific thought and society including the history of science and contributions of scientists as related to the content.	**3.D** Relate the impact of research on scientific thought and society including the history of science and contributions of scientists as related to the content.	**3.D** Relate the impact of research on scientific thought and society including the history of science and contributions of scientists as related to the content.	**3.D** Evaluate the impact of research on scientific thought, society, and the environment.	**3.D** Evaluate the impact of scientific research on society and the environment.	**3.D** Evaluate the impact of research on scientific thought, society, and the environment.	**3.C** Explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society.
			3.F Research and describe the history of physics, chemistry and contributions of scientists.	**3.F** Research and describe the history of biology and contributions of scientists.	**3.F** Describe the history of chemistry and contributions of scientists.	**3.D** Research and describe the connections between physics and future careers.
			3.E Describe connections between physics and chemistry and future careers.		**3.E** Describe the connection between chemistry and future careers.	

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(4) Scientific investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry. The student is expected to:	*(4) Science investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry. The student is expected to:*	*4) Scientific investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry. The student is expected to:*				
4.A Use appropriate tools, including journals/notebooks, beakers, Petri dishes, meter sticks, graduated cylinders, hot plates, test tubes, balances, microscopes, thermometers, calculators, computers, timing devices, and other necessary equipment to collect, record, and analyze information.	**4.A** Use appropriate tools including: life science models, hand lenses, stereoscopes, microscopes, beakers, Petri dishes, microscope slides, graduated cylinders, test tubes, meter sticks, metric rulers, metric tape measures, timing devices, hot plates, balances, thermometers, calculators, water test kits, computers, temperature and pH probes, collecting nets, insect traps, globes, digital cameras and journals/notebooks and other necessary equipment to collect, record, and analyze information.	**4.A** Use appropriate tools including: lab journals/notebooks, beakers, meter sticks, graduated cylinders, anemometers, psychrometers, hot plates, test tubes, spring scales, balances, microscopes, thermometers, calculators, computers, spectroscopes, timing devices, and other necessary equipment to collect, record, and analyze information.				**2.E** Demonstrate the use of course apparatus, equipment, techniques, and procedures including multimeters (current, voltage, resistance), balances, batteries, dynamics demonstration equipment, collision apparatus, lab masses, magnets, plane mirrors, convex lenses, stopwatches, trajectory apparatus, graph paper, magnetic compasses, protractors, metric rulers, spring scales, thermometers, slinky springs and/or other equipment and materials that will produce the same results.
						2.F Use a wide variety of additional course apparatus, equipment, techniques, materials, and procedures as appropriate such as ripple tank with wave generator, wave motion rope, tuning forks, hand-held visual spectroscopes, discharge tubes with power supply (H, He, Ne, Ar), electromagnetic spectrum

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						charts, laser pointers, micrometer, caliper, computer, data acquisition probes, scientific calculators, graphing technology, electrostatic kits, electroscope, inclined plane, optics bench, optics kit, polarized film, prisms, pulley with table clamp, motion detectors, photogates, friction blocks, ballistic carts or equivalent, resonance tube, stroboscope, resistors, copper wire, switches, iron filings, and/or other equipment and materials that will produce the same results.
4.B Use preventative safety equipment including chemical splash goggles, aprons and gloves, and be prepared to use emergency safety equipment including an eye/face wash, a fire blanket, and a fire extinguisher.	**4.B** Use preventative safety equipment including chemical splash goggles, aprons and gloves, and be prepared to use emergency safety equipment including an eye/face wash, a fire blanket, and a fire extinguisher.	**4.B** Use preventative safety equipment including chemical splash goggles, aprons and gloves, and be prepared to use emergency safety equipment including an eye/face wash, a fire blanket, and a fire extinguisher.				
(5) Matter and energy. The student knows the differences between elements and compounds. The student is expected to:	*(5) Matter and energy. The student knows that interactions occur between matter and energy. The student is expected to:*	*(5) Matter and energy. The student knows that matter is composed of atoms and has chemical and physical properties. The student is expected to:*	*(6) Science concepts. The student knows that relationships exist between the structure and properties of matter. The student is expected to:*		*(4) Science concepts. The student knows the characteristics of matter and can analyze the relationships between chemical and physical changes and properties. The student is expected to:*	

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	(6) Matter and energy. The student knows that matter has physical and chemical properties and can undergo physical and chemical changes. The student is expected to				*(5) Science concepts. The student understands the historical development of the Periodic Table and can apply its predictive power. The student is expected to:*	
		5.A Describe the structure of atoms including the masses, electrical charges and locations of protons and neutrons in the nucleus and electrons in the electron cloud.	**6.B** Relate chemical properties of substances to the arrangement of their atoms.			
5.A Know that an element is a pure substance represented by a chemical symbol and that a compound is a pure substance represented by a chemical formula.		**5.B** Identify that protons determine an element's identity, and valence electrons determine its chemical properties including reactivity.			**4.D** Classify matter as pure substances or mixtures through investigation of their properties.	
					6.D Express the arrangement of electrons in atoms of representative elements using electron configurations and Lewis valence electron dot structures.	
					6.C Calculate average atomic mass of an element using isotopic composition.	
5.B Recognize that a limited number of the many known elements comprise the largest portion of solid Earth, living matter, oceans, and the atmosphere.						
		5.C Interpret the arrangement of the Periodic Table including groups and periods, to explain how properties are used to classify elements.	**6.D** Relate the placement of an element on the Periodic table to its physical and chemical behavior, including bonding and classification.		**5.A** Explain the use of chemical and physical properties in the historical development of the Periodic Table.	

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					5.B Identify and explain the properties of chemical families including alkali metals, alkaline earth metals, halogens, noble gases, and transition metals, using the Periodic Table.	
					5.C Interpret periodic trends including atomic radius, electronegativity, and ionization energy using the Periodic Table.	
					(7) Science concepts. The student knows how atoms form ionic, covalent, and metallic bonds. The student is expected to:	
					7.A Name ionic compounds containing main group or transition metals, covalent compounds, acids, and bases, using International Union of Pure and Applied Chemistry (IUPAC) nomenclature rules.	
					7.B Write the chemical formulas of ionic compounds containing representative elements, transition metals and common polyatomic ions, covalent compounds, and acids and bases.	
					7.C Construct electron dot formulas to illustrate ionic and covalent bonds.	
					7.E Classify molecular structure for molecules with linear, trigonal planar, and tetrahedral electron pair geometries as explained by	

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					Valence Shell Electron Pair Repulsion (VSEPR) theory.	
5.C Identify the formation of a new substance by using the evidence of a possible chemical change such as production of a gas, change in temperature, production of a precipitate, or color change.	**6** Distinguish between physical and chemical changes in matter	**5.E** Investigate how evidence of chemical reactions indicates that new substances with different properties are formed and how that relates to the law of conservation of mass.	**7.B** Recognize that chemical changes can occur when substances react to form different substances and that these interactions are largely determined by the valence electrons.		**4.A** Differentiate between physical and chemical changes and properties.	
			7.D Classify energy changes that accompany chemical reactions such as those occurring in heat packs, cold packs, and glow sticks as exothermic or endothermic reactions.			
					(6) Science concepts. The student knows and understands the historical development of atomic theory. The student is expected to:	
					6.A Describe the experimental design and conclusions used in the development of modern atomic theory including Dalton's Postulates, Thomson's discovery of electron properties, Rutherford's nuclear atom, and Bohr's nuclear atom.	
					(12) Science concepts. The student understands the basic processes of nuclear chemistry. The student is expected to:	*(8) Science concepts. The student knows simple examples of atomic, nuclear, and quantum phenomena. The student is expected to:*
			7.E Describe types of nuclear reactions such as fission and fusion and their		**12.A** Describe the characteristics of alpha, beta and gamma radioactive	**8.D** Give examples of applications of atomic and nuclear phenomena using

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			roles in applications such as medicine and energy production.		decay processes in terms of balanced nuclear equations.	the standard model such as nuclear stability, fission and fusion, radiation therapy, diagnostic imaging, semiconductors, superconductors, solar cells, and nuclear power and examples of applications of quantum phenomena.
					12.B Compare fission and fusion reactions.	
						8.A Describe the photoelectric effect and the dual nature of light.
						8.B Compare and explain the emission spectra produced by various atoms.
						8.C Calculate and describe the applications of mass–energy equivalence.
			7.F Research and describe the environmental and economic impact of the end-products of chemical reactions such as those that may result in acid rain, degradation of water and air quality, and ozone depletion.			
(6) Matter and energy. The student knows matter has physical properties that can be used for classification. The student is expected to:			*(6) Science concepts. The student knows that relationships exist between the structure and properties of matter. The student is expected to:*			
6.A Compare metals, nonmetals, and metalloids using physical properties such as luster, conductivity or malleability.					**7.D** Describe metallic bonding and explain metallic properties such as thermal and electrical conductivity, malleability and ductility.	
6.B Calculate density to identify an unknown substance.			**6.C** Analyze physical and chemical properties of elements and compounds		**4.B** Identify extensive properties such as mass and volume and intensive	

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			such as, color, density, viscosity, buoyancy, boiling point, freezing point, conductivity, and reactivity.		properties such as density and melting point.	
6.C Test the physical properties of minerals including hardness, color, luster, and streak.						
					(9) Science concepts. The student understands the principles of ideal gas behavior, kinetic molecular theory, and the conditions that influence the behavior of gases. The student is expected to:	
			6.A Examine differences in physical properties of solids, liquids and gases as explained by the arrangement and motion of atoms or molecules.		**4.C** Compare solids, liquids, and gases in terms of compressibility, structure, shape, and volume.	
					9.A Describe and calculate the relations between volume, pressure, number of moles, and temperature for an ideal gas, as described by Boyle's Law, Charles' Law, Avogadro's Law, Dalton's Law of partial pressure and the ideal gas law.	
					9.B Describe the postulates of kinetic molecular theory.	
					(10) Science concepts. The student understands and can apply the factors that influence the behavior of solutions. The student is expected to:	
			6.E Relate the structure of water to its function as a solvent.		**10.A** Describe the unique role of water in solutions in terms of polarity.	

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			6.F Investigate the properties of water solutions and factors affecting solid solubility including nature of solute, temperature, and concentration.		**10.B** Apply general rules regarding solubility through investigations with aqueous solutions.	
					10.C Calculate the concentration of solutions in units of molarity.	
					10.D Calculate the dilutions of solutions using molarity.	
					10.E Distinguish among types of solutions such as electrolytes and nonelectrolytes; unsaturated, saturated, and supersaturated solutions; and strong and weak acids and bases.	
					10.F Investigate factors that influence solid and gas solubilities and rates of dissolution such as temperature, agitation, and surface area.	
					10.G Define acids and bases and distinguish between Arrhenius and Bronsted-Lowery definitions; and predict products in acid-base reactions that form water.	
					10.H Define pH and calculate the pH of a solution using the hydrogen ion concentration.	
					(8) Science concepts. The student can quantify the changes that occur during chemical reactions. The student is expected to:	
					8.A Define and use the concept of a mole.	

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					8.B Calculate the number of atoms or molecules in a sample of material using Avogadro's number.	
					8.C Calculate percent composition of compounds.	
					8.D Differentiate between empirical and molecular formulas	
		5.D Recognize that chemical formulas are used to identify substances and determine the number of atoms of each element in chemical formulas containing subscripts.	**7.C** Demonstrate that mass is conserved when substances undergo chemical change and that the number and kind of atoms are the same in the reactants and products.		**8.E** Write and balance chemical equations using the law of conservation of mass.	
					8.F Differentiate among double replacement reactions, including acid-base reactions and precipitation reactions, and oxidation-reduction reactions such as synthesis, decomposition, single replacement, and combustion reactions.	
					8.G Perform stoichiometric calculations including determination of mass and gas volume relationships between reactants and products, and percent yield.	
					8.H Describe the concept of limiting reactants in a balanced chemical equation.	
(7) Matter and energy. The student knows that some of Earth's energy resources are available on a nearly perpetual basis, while others can be renewed over a relatively short period of time. Some energy						

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resources, once depleted, are essentially nonrenewable. The student is expected to						
7 Research and discuss the advantages and disadvantages of using coal, oil, natural gas, nuclear power, biomass, wind, hydropower, geothermal, and solar resources.						
(8) Force, motion, and energy. The student knows force and motion are related to potential and kinetic energy. The student is expected to:	*(7) Force, motion, and energy. The student knows that there is a relationship among force, motion, and energy. The student is expected to:*	*(6) Force, motion, and energy. The student knows that there is a relationship between force, motion, and energy. The student is expected to:*	*(4) Science concepts. The student knows concepts of force and motion evident in everyday life. The student is expected to:*		*(11) Science concepts. The student understands the energy changes that occur in chemical reactions. The student is expected to:*	*(4) Science concepts. The student knows and applies the laws governing motion in a variety of situations. The student is expected to:*
8.A Compare and contrast potential and kinetic energy.			**5.A** Recognize and demonstrate that objects and substances in motion have kinetic energy such as vibration of atoms, water flowing down a stream moving pebbles, and bowling balls knocking down pins.		**11.A** Describe energy and its forms including kinetic, potential, chemical and thermal energies.	**6.B** Investigate examples of kinetic and potential energy and their transformations.
			5.B Recognize and demonstrate common forms of potential energy including gravitational, elastic, and chemical, such as a ball on an inclined plane, springs and batteries.			
8.B Identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces.		**6.A** Demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion.	**4.C** Investigate how an object's motion changes only when a net force is applied, including activities and equipment such as toy cars, vehicle restraints, sports activities and classroom objects.			
						4.A Generate and interpret graphs and charts describing different types of

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						motion including investigations using real-time technology such as motion detectors or photogates.
8.C Calculate average speed using distance and time measurements.		**6.B** Differentiate between speed, velocity and acceleration.	**4.A** Describe and calculate an object's motion in terms of position, displacement, speed and acceleration.			.
8.D Measure and graph changes in motion.		**6.C** Investigate and describe applications of Newton's three laws of motion such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches.	**4.B** Measure and graph distance and speed as a function of time.			**4.B** Describe and analyze motion in one dimension using equations and graphical vector addition with the concepts of distance, displacement, speed, average velocity, instantaneous velocity, frames of reference, and acceleration
			4.D Describe and calculate the relationship between force, mass and acceleration, using equipment such as dynamic carts, moving toys, vehicles and falling objects.			**4.C** Analyze and describe accelerated motion in two dimensions including using equations, graphical vector addition, and projectile and circular examples.
8.E Investigate how inclined planes can be used to change the amount of force to move an object.						**4.D** Calculate the effect of forces on objects including the law of inertia, the relationship between force and acceleration, and the nature of force pairs between objects using methods, including free-body force diagrams.
			4.E Explain the concept of conservation of momentum using action and reaction forces.			

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						(5) Science concepts. The student knows the nature of forces in the physical world. The student is expected to:
			4.F Describe the gravitational attraction between objects of different masses at different distances.			**5.A** Describe the concepts of gravitational, electromagnetic, weak nuclear, and strong nuclear forces.
			4.G Examine electrical force as a universal force between any two charged objects.			
						5.B Describe and calculate how the magnitude of the gravitational force between two objects depends on their masses and the distance between their centers.
						5.C Describe and calculate how the magnitude of the electric force between two objects depends on their charges and the distance between their centers.
	7.B Demonstrate and illustrate forces that affect motion in organisms such as emergence of seedlings, turgor pressure, geotropism and circulation of blood.		**5.C** Demonstrate that moving electric charges produce magnetic forces and moving magnets produce electric forces.			**5.D** Identify and describe examples of electric and magnetic forces and fields in everyday life such as generators, motors, and transformers.
						5.E Characterize materials as conductors or insulators based on their electric properties.
						5.F Investigate and calculate potential difference across, resistance of, and power used by electric circuit elements connected in both

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						series and parallel combinations.
(9) Force, motion, and energy. The student knows that the Law of Conservation of Energy states that energy can neither be created nor destroyed, it just changes form. The student is expected to:			*(5) Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life. The student is expected to:*			*(6) Science concepts. The student knows that changes occur within a physical system and applies the laws of conservation of energy and momentum. The student is expected to:*
						6.A Investigate and calculate with the work-energy theorem in various situations.
						6.C Calculate the mechanical energy of, power generated within, impulse applied to, and momentum of a physical system.
			5.D Investigate the law of conservation of energy.		**11.B** Describe the law of conservation of energy and the processes of heat transfer in terms of calorimetry.	**6.D** Demonstrate and apply the laws of conservation of energy and conservation of momentum in one dimension.
9.A Investigate methods of thermal energy transfer including conduction, convection, and radiation.	**7.A** Illustrate the transformation of energy within an organism such as the transfer from chemical energy to thermal energy		**5.E** Investigate and demonstrate the movement of thermal energy through solids, liquids, and gases by convection, conduction and radiation, such as in weather, living and mechanical systems.		**11.C** Classify reactions as exothermic or endothermic and represent energy changes that occur in chemical reactions using thermochemical equations or graphical analysis.	**6.E** Explain everyday examples that illustrate the laws of thermodynamics and the processes of thermal energy transfer.
9.B Verify through investigations that thermal energy moves in a predictable pattern from warmer to cooler until all the substances attain the same temperature such as an ice cube melting.			**7.A** Investigate changes of state as it relates to the arrangement of particles of matter and energy transfer.		**11.D** Perform calculations involving heat, mass, temperature change and specific heat.	

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Grade 6	*Grade 7*	*Grade 8*	*IPC*	*Biology*	*Chemistry*	*Physics*
9.C Demonstrate energy transformations such as the energy in a flashlight battery changes from chemical energy to electrical energy to light energy.	**5.A** Recognize that radiant energy from the sun is transformed into chemical energy through the process of photosynthesis.		**5.F** Evaluate the transfer of electrical energy in series and parallel circuits, and conductive materials.			
						(7) Science concepts. The student knows the characteristics and behavior of waves. The student is expected to:
			5.G Explore the characteristics and behaviors of energy transferred by waves including acoustic, seismic, light and waves on water as they reflect, refract, diffract, interfere with one another, and are absorbed by materials.			**7.A** Examine and describe oscillatory motion and wave propagation in various types of media.
					6.B Describe the mathematical relationships between energy, frequency, and wavelength of light using the electromagnetic spectrum.	**7.B** Investigate and analyze characteristics of waves including velocity, frequency, amplitude, and wavelength and calculate using the relationship between wavespeed, frequency, and wavelength.
						7.C Compare characteristics and behaviors of transverse waves including electromagnetic waves and the electromagnetic spectrum and characteristics and behaviors of longitudinal waves including sound waves.

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						7.D Investigate behaviors of waves including reflection, refraction, diffraction, interference, resonance, and the Doppler effect.
						7.E Describe and predict image formation as a consequence of reflection from a plane mirror and refraction through a thin convex lens.
			5.H Analyze energy transformations of renewable and nonrenewable resources.			
			5.I Critique the advantages and disadvantages of various energy sources and their impact on society and the environment.			
(10) Earth and space. The student understands the structure of Earth, the rock cycle, and plate tectonics. The student is expected to:	*(8) Earth and space. The student knows that natural events and human activity can impact Earth systems. The student is expected to:*	*(9) Earth and space. The student knows that natural events can impact Earth systems. The student is expected to:*				
10.A Build a model to illustrate the compositional and mechanical layers of Earth including the inner core, outer core, mantle, crust, asthenosphere, and lithosphere.		**9.A** Describe the historical development of evidence that supports plate tectonic theory.				
10.B Classify rocks as metamorphic, igneous, or sedimentary by the processes of their formation.						
10.C Identify the major tectonic plates including Eurasian, African, Indo-Australian,		**9.B** Relate plate tectonics to the formation of crustal features.				

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Grade 6	Grade 7	Grade 8	IPC	Biology	Chemistry	Physics
Pacific, North American, and South American.						
10.D Describe how plate tectonics causes major geological events, such as ocean basin formation, earthquakes, volcanic eruptions, and mountain building.						
	8.B Analyze the effects of weathering, erosion, and deposition on the environment in ecoregions of Texas.	**9.C** Interpret topographic maps and satellite views to identify land and erosional features and predict how these features may be reshaped by weathering.				
(11) Earth and space. The student understands the organization of our solar system and the relationships among the various bodies that comprise it. The student is expected to:		*(7) Earth and space. The student knows the effects resulting from cyclical movements of the Sun, Earth, and Moon. The student is expected to:*				
	(9) Earth and space. The student knows components of our solar system. The student is expected to:	*(8) Earth and space. The student knows characteristics of the universe. The student is expected to:*				
		7.A Model and illustrate how the tilted Earth rotates on its axis, causing day and night, and revolves around the sun causing changes in seasons.				
		7.B Demonstrate and predict the sequence of events in the lunar cycle.				
11.B Understand that gravity is the force that governs the motion of our solar system.		**7.C** Relate the positions of the Moon and Sun to their effect on ocean tides.				
11.A Describe the physical properties, locations, and movements of the Sun, planets,		**8.A** Describe components of the universe including stars, nebulae and galaxies, and use models such as the				

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moons, meteors, asteroids, and comets.		Herztsprung-Russell diagram for classification.				
		8.B Recognize that the Sun is a medium-sized star located in the spiral arm of the Milky Way galaxy and that the Sun is many thousands of times closer to Earth than any other star.				
		8.C Identify how different wavelengths of the electromagnetic spectrum such as visible light and radio waves are used to gain information about components in the universe.				
		8.D Research how scientific data are used as evidence to develop scientific theories to describe the origin of the universe.				
	9.A Analyze the characteristics of objects in our solar system that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere.					
11.C Describe the history and future of space exploration including the types of equipment and transportation needed for space travel.	**9.B** Identify the accommodations, considering the characteristics of our solar system, that enabled manned space exploration.					
		(10) Earth and space. The student knows that climatic interactions exist among Earth, ocean, and weather systems. The student is expected to:				
		10.A Recognize that the Sun provides the energy that drives convection within the				

Grade 6	Grade 7	Grade 8	IPC	Biology	Chemistry	Physics
		atmosphere and oceans, producing winds.				
		10.B Identify how global patterns of atmospheric movement influence local weather using weather maps that show high and low pressures and fronts.				
		10.C Identify the role of the oceans in the formation of weather systems, such as hurricanes.				
(12) Organisms and environments. The student knows all organisms are classified into domains and kingdoms. Organisms within these taxonomic groups share similar characteristics that allow them to interact with the living and nonliving parts of their ecosystem. The student is expected to:	*(10) Organisms and environments. The student knows that there is a relationship between organisms and the environment. The student is expected to:*	*(11) Organisms and environments. The student knows that interdependence occurs among living systems and the environment and that human activities can affect these systems. The student is expected to:*		*(11) Science concepts. The student knows that biological systems work to achieve and maintain balance. The student is expected to:*		
	(8) Earth and space. The student knows that natural events and human activity can impact Earth systems. The student is expected to:			*(12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to:*		
12.E Describe biotic and abiotic parts of an ecosystem in which organisms interact.	**10.A** Observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms.	**11.A** Investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as quantity of light, water, range of temperatures, or soil composition.				
				12.A Interpret relationships including predation, parasitism, commensalism, mutualism,		

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				and competition among organisms.		
	10.B Describe how biodiversity contributes to the sustainability of an ecosystem.			**12.B** Compare variations and adaptations of organisms in different ecosystems.		
	5.B Diagram the flow of energy through living systems including food chains, food webs and energy pyramids.			**12.C** Analyze the flow of matter and energy through trophic levels using various models including food chains, food webs, and ecological pyramids.		
				12.D Describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles.		
	8.A Predict and describe how catastrophic events such as floods, hurricanes, or tornadoes impact ecosystems.	**11.B** Explore how short and long-term environmental changes affect organisms and traits in subsequent populations.		**12.E** Describe how environmental change can impact ecosystem stability.		
	10.C Observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds.			**11.B** Describe how events and processes that occur during ecological succession can change populations and species diversity.		
	8.C Model the effects of human activity on ground water and surface water in a watershed.	**11.C** Recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems.		**11.A** Summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems.		
	(11) Organisms and environments. The student knows that populations and species demonstrate variation and inherit many of their unique traits through gradual processes over many			*(8) Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new*		

Grade 6	Grade 7	Grade 8	IPC	Biology	Chemistry	Physics
	generations. The student is expected to:			*discoveries are made. The student is expected to:*		
	11.A Examine organisms or their structures, such as insects or leaves, and use dichotomous keys for identification.			**8.B** Categorize organisms using a hierarchical classification system based on similarities and differences shared among groups.		
	11.B Explain variation within a population or species by comparing external features, behaviors, or physiology of organisms that enhance their survival such as migration, hibernation, or storage of food in a bulb.					
				8.A Define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community		
				(7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to:		
				7.A Analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies including anatomical, molecular, and developmental.		
	11.C Identify some changes in genetic traits that have occurred over several generations through natural selection and selective breeding such as the Galapagos Medium Ground			**7.D** Analyze and evaluate how the elements of natural selection including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental		

Grade 6	Grade 7	Grade 8	IPC	Biology	Chemistry	Physics
	Finch (*Geospiza fortis*) or domestic animals and hybrid plants.			resources result in differential reproductive success.		
				7.E Analyze and evaluate the relationship of natural selection to adaptation, and to the development of diversity in and among species.		
				7.C Analyze and evaluate how natural selection produces change in populations, not individuals.		
				7.B Examine scientific explanations of abrupt appearance and stasis in the fossil record.		
				7.F Analyze other evolutionary mechanisms including genetic drift, gene flow, mutation, and recombination.		
	(12) Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function. The student is expected to:			*(10) Science concepts. The student knows that biological systems are composed of multiple levels. The student is expected to:*		
12.A Understand that all organisms are composed of one or more cells	**12.F** Recognize components of cell theory.					
	12.A Investigate and explain how internal structures of organisms have adaptations that allow specific functions, such as gills in fish, hollow bones in birds, or xylem in plants.					
	12.B Identify the main functions of the systems of the human organism including the circulatory, respiratory,			**10.A** Describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption,		

Grade 6	*Grade 7*	*Grade 8*	*IPC*	*Biology*	*Chemistry*	*Physics*
	skeletal, muscular, digestive, excretory, reproductive, integumentary, nervous, and endocrine systems.			reproduction, and defense from injury or illness in animals.		
				10.B Describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants.		
				(4) Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. The student is expected to:		
12.B Recognize the presence of a nucleus is a key factor used to determine whether a cell is prokaryotic or eukaryotic.	**12.D** Differentiate between structure and function in plant and animal cell organelles including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole.			**4.A** Compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity.		
12.D Identify the basic characteristics of organisms, including prokaryotic or eukaryotic, unicellular or multicellular, autotrophic or heterotrophic, and mode of reproduction, that further classify them in the currently recognized kingdoms.				**4.C** Compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases, such as human immunodeficiency virus (HIV) and influenza.		
12.C Recognize the broadest taxonomic classification of living organisms is divided into currently recognized domains.				**8.C** Compare characteristics of taxonomic groups including archaea, bacteria, protists, fungi, plants, and animals.		
	12.E Compare the functions of cell organelles to the functions of an organ system.			**4.B** Investigate and explain cellular processes including homeostasis and transport of molecules.		

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Grade 6	*Grade 7*	*Grade 8*	*IPC*	*Biology*	*Chemistry*	*Physics*
12.F Diagram the levels of organization within an ecosystem including organism, population, community, and ecosystem.	**12.C** Recognize levels of organization in plants and animals including cells, tissues, organs, organ systems, and organisms.			**10.C** Analyze the levels of organization in biological systems and relate the levels to each other and to the whole system.		
				(9) Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. The student is expected to:		
				9.A Compare the functions of different types of biomolecules including carbohydrates, lipids, proteins, and nucleic acids.		
	5.A Recognize that radiant energy from the sun is transformed into chemical energy through the process of photosynthesis.			**9.B** Compare the reactants and products of photosynthesis and cellular respiration in terms of energy, energy conversions, and matter.		
				9.C Identify and investigate the role of enzymes.		
				(5) Science concepts. The student knows how an organism grows and the importance of cell differentiation. The student is expected to:		
				5.A Describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms.		
				5.B Describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation.		

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				5.C Recognize that disruptions of the cell cycle lead to diseases such as cancer.		
	(13) Organisms and environments. The student knows that a living organism must be able to maintain balance in stable internal conditions in response to external and internal stimuli. The student is expected to:					
	13.A Investigate how organisms respond to external stimuli found in the environment such as phototropism and fight or flight.					
	13.B Describe and relate responses in organisms that may result from internal stimuli such as wilting in plants and fever or vomiting in animals that allow them to maintain balance.					
	(14) Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material. The student is expected to:			*(6) Science concepts. The student knows the mechanisms of genetics, such as the role of nucleic acids and the principles of Mendelian and non-Mendelian Genetics. The student is expected to:*		
	14.A Define heredity as the passage of genetic instructions from one generation to the next generation.			**6.F** Predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses and non-Mendelian inheritance.		

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Grade 6	*Grade 7*	*Grade 8*	*IPC*	*Biology*	*Chemistry*	*Physics*
	14.B Compare the results of uniform or diverse offspring from asexual or sexual reproduction.			**6.G** Recognize the significance of meiosis to sexual reproduction.		
	14.C Recognize that inherited traits of individuals are governed in the genetic material found in the genes within the chromosomes in the nucleus.			**6.A** Identify components of DNA, identify how information for specifying the traits of an organism is carried in the DNA, and examine scientific explanations for the origin of DNA.		
				6.B Recognize that components that make up the genetic code are common to all organisms.		
				6.C Explain the purpose and process of transcription, and translation using models of DNA and RNA.		
				6.D Recognize that gene expression is a regulated process.		
				6.E Identify and illustrate changes in DNA and evaluate the significance of these changes.		