Science Process TEKS -Vertical Alignment

Nature of Science							
Grade Five	**Grade Six**	**Grade Seven**	**Grade 8**	**Biology**	**Chemistry**	**IPC**	**Physics**
5.1 Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school 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 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:
(A) demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations.	(A) demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards	(A) demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards	(A) demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards	(A) demonstrate safe practices during laboratory and field investigations	(A) demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles, and fire extinguishers	(A) demonstrate safe practices during laboratory and field investigations	(A) demonstrate safe practices during laboratory and field investigations
(B) make informed choices in the conservation, disposal, and recycling of materials	(B) practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials	(B) practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials	(B) practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials	(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials	(C) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials	(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials	(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials
					(B) know specific hazards of chemical substances such as flammability, corrosiveness, and radioactivity as summarized on the Material Safety Data Sheets (MSDS)		

Nature of Science							
Grade Five	**Grade Six**	**Grade Seven**	**Grade 8**	**Biology**	**Chemistry**	**IPC**	**Physics**
5.2 Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and outdoor investigations. The student is expected to:	(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and field investigations. The student is expected to:	(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and field investigations. The student is expected to	(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and field investigations. The student is expected to	(2) Scientific processes. The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to	(2) Scientific processes. The student uses scientific methods to solve investigative questions. The student is expected to	(2) Scientific processes. The student uses scientific methods during laboratory and field investigations. 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:
(A) describe, plan, and implement simple experimental investigations testing one variable	(A) plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and using appropriate equipment and technology	(A) plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and using appropriate equipment and technology	(A) plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and using appropriate equipment and technology	(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology			
(B) ask well-defined questions, formulate testable hypothesis, and select and use appropriate equipment and technology	(B) design and implement experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology;	(B) design and implement experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology	(B) design and implement comparative and experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology				(E) 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
(C) collect information by detailed observation and accurate measuring	(C) collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers	(C) collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers	(C) collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers	(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, gel electrophoresis apparatuses, micropipettors, hand lenses, Celsius	(E) plan and implement investigative procedures, including asking questions, formulating testable hypotheses, and selecting equipment and technology, including graphing calculators, computers and probes, sufficient scientific glassware such as beakers, Erlenmeyer flasks, pipettes, graduated cylinders, volumetric flasks, safety goggles, and burettes, electronic balances, and an adequate supply of	(B) plan and implement investigative procedures, including asking questions, formulating testable hypotheses, and selecting equipment and technology	(F) demonstrate the use of course apparatus, equipment, techniques, and procedures, including multimeters (current, voltage, resistance), triple beam balances, batteries, clamps, dynamics demonstration equipment, collision apparatus, data acquisition probes, discharge tubes with power supply (H, He, Ne, Ar), hand-held visual spectroscopes, hot plates, slotted and hooked lab masses, bar magnets, horseshoe

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Grade Five	**Grade Six**	**Grade Seven**	**Grade 8**	**Biology**	**Chemistry**	**IPC**	**Physics**
				thermometers, hot plates, lab notebooks or journals, timing devices, cameras, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;	consumable chemicals		magnets, plane mirrors, convex lenses, pendulum support, power supply, ring clamps, ring stands, stopwatches, trajectory apparatus, tuning forks, carbon paper, graph paper, magnetic compasses, polarized film, prisms, protractors, resistors, friction blocks, mini lamps (bulbs) and sockets, electrostatics kits, 90-degree rod clamps, metric rulers, spring scales, knife blade switches, Celsius thermometers, meter sticks, scientific calculators, graphing technology, computers, cathode ray tubes with horseshoe magnets, ballistic carts or equivalent, resonance tubes, spools of nylon thread or string, containers of iron filings, rolls of white craft paper, copper wire, Periodic Table, electromagnetic spectrum charts, slinky springs, wave motion ropes, and laser pointers;
							(G) 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, micrometer, caliper, radiation monitor, computer, ballistic pendulum, electroscope, inclined plane, optics bench, optics kit, pulley with

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Grade Five	**Grade Six**	**Grade Seven**	**Grade 8**	**Biology**	**Chemistry**	**IPC**	**Physics**
							table clamp, resonance tube, ring stand screen, four inch ring, stroboscope, graduated cylinders, and ticker timer
(G) construct appropriate simple tables, and chart using technology, including computers to organize, examine, and evaluate information	(D) construct tables and graphs, using repeated trials and means, to organize data and identify patterns	(D) construct tables and graphs, using repeated trials and means, to organize data and identify patterns	(D) construct tables and graphs, using repeated trials and means, to organize data and identify patterns	(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	(F) collect data and make measurements with accuracy and precision	(C) collect data and make measurements with precision	(H) make measurements with accuracy and precision and record data using scientific notation and International System (SI) units
(F) communicate valid conclusions in both written and verbal forms						(E) communicate valid conclusions	(K) 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 report
(D) analyze and interpret information to construct reasonable explanations from direct (observable) and indirect (inferred) evidence	(E) analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends	(E) analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends	(E) analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.	(G) analyze, evaluate, make inferences, and predict trends from data;	(H) organize, analyze, evaluate, make inferences, and predict trends from data	(D) organize, analyze, evaluate, make inferences, and predict trends from data;	(J) organize and evaluate data and make inferences from data, including the use of tables, charts, and graphs
(E) demonstrate that repeated investigations may increase the reliability of results				(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section	(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section	(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section	(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section
				(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 which have been tested over a wide variety of	(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 which have been tested over a wide variety of		(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 which have been tested over a wide variety of

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Grade Five	**Grade Six**	**Grade Seven**	**Grade 8**	**Biology**	**Chemistry**	**IPC**	**Physics**
				conditions are incorporated into theories	conditions are incorporated into theories;		conditions are incorporated into theories;
				(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 of science and new technologies are developed	(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 may be subject to change as new areas of science and new technologies are developed		(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 may be subject to change as new areas of science and new technologies are developed
				(D) distinguish between scientific hypotheses and scientific theories	(D) distinguish between scientific hypotheses and scientific theories		(D) distinguish between scientific hypotheses and scientific theories;
					(G) express and manipulate chemical quantities using scientific conventions and mathematical procedures, including dimensional analysis, scientific notation, and significant figures		(L) express and manipulate relationships among physical variables quantitatively, including the use of graphs, charts, and equations
					(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		(I) identify and quantify causes and effects of uncertainties in measured data;

Nature of Science

Grade Five	Grade Six	Grade Seven	Grade 8	Biology	Chemistry	IPC	Physics
(3) Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions. 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 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 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. 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:
(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student
(D) connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists	(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	(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	(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	(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials	(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials	(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials	(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials
(B) evaluate the accuracy of the information related to promotional materials for products and services such as nutritional labels	(C) identify advantages and limitations of models such as size, scale, properties, and materials;	(C) identify advantages and limitations of models such as size, scale, properties, and materials	(C) identify advantages and limitations of models such as size, scale, properties, and materials	(D) evaluate the impact of scientific research on society and the environment	(D) evaluate the impact of research on scientific thought, society, and the environment;	(D) evaluate the impact of research on scientific thought, society, and the environment	(F) express and interpret relationships symbolically in accordance with accepted theories to make predictions and solve problems mathematically, including problems requiring proportional reasoning and graphical

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							vector addition
(C) draw or develop a model that represents how something works or looks that cannot be seen such as how a soda dispensing machine works	(B) use models to represent aspects of the natural world such as a model of Earth's layers;	(B) use models to represent aspects of the natural world such as human body systems and plant and animal cells	(B) use models to represent aspects of the natural world such as an atom, a molecule, space, or a geologic feature	(E) evaluate models according to their limitations in representing biological objects or events			
				(C) draw inferences based on data related to promotional materials for products and services	(C) draw inferences based on data related to promotional materials for products and services	(C) draw inferences based on data related to promotional materials for products and services	(C) draw inferences based on data related to promotional materials for products and services
				(F) research and describe the history of biology and contributions of scientists	(E) describe the connection between chemistry and future careers	(E) describe connections between physics and chemistry and future careers	(E) research and describe the connections between physics and future careers
					(F) research and describe the history of chemistry and contributions of scientists	(F) research and describe the history of physics and chemistry and contributions of scientists	(D) explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society
(4) Scientific investigation and reasoning. The student knows how to use a variety of tools and methods to conduct science inquiry. The student is expected	(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				
(A) collect, record, and analyze information using tools, including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, prisms, mirrors, pan balances, triple beam balances, spring scales, graduated cylinders, beakers, hot plates, meter sticks, magnets, collecting nets, and notebooks; timing devices, including clocks and stopwatches; and	(A) use appropriate tools to collect, record, and analyze information, including journals/notebooks, beakers, Petri dishes, meter sticks, graduated cylinders, hot plates, test tubes, triple beam balances, microscopes, thermometers, calculators, computers, timing devices, and other equipment as needed to teach the curriculum;	(A) use appropriate tools to collect, record, and analyze information, including life science models, hand lens, 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	(A) use appropriate tools to collect, record, and analyze information, 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 equipment as needed to			

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materials to support observations of habitats or organisms such as terrariums and aquariums		kits, computers, temperature and pH probes, collecting nets, insect traps, globes, digital cameras, journals/notebooks, and other equipment as needed to teach the curriculum	teach the curriculum				
(B) use safety equipment, including safety goggles and gloves	(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	(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	(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				