Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and Design (One Science Credit).			
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement

(a) General Requirements. This course is recommended for students in Grades 11-12. Prerequisite: one unit of high school science. To receive credit in science, students must meet the 40% laboratory and fieldwork requirement identified in §74.3(b)(2)(C) of this title (relating to Description of a Required Secondary Curriculum).

(b) Introduction.

- (1) Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.
- (2) Scientific inquiry. Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation are experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.
- (3) Science and social ethics. Scientific decision making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).
- (4) Scientific systems. A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.

Page 1 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education				
Course Title	§130.372 Scientific Research and	d Design (One Science Credit).			
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement	
(c) Knowledge and Skills.					
(1) The student, for at least 40% of instructional time, conducts laboratory and field investigations 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 during laboratory and field investigations	(1) demonstrate safe practices during laboratory investigations			
(1) The student, for at least 40% of instructional time, conducts laboratory and field investigations 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 during laboratory and field investigations	(2) demonstrate safe practices during field investigations			

Page 2 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D	esign (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(1) The student, for at least	(B) demonstrate an understanding of	(1) demonstrate an understanding		
40% of instructional time,	the use and conservation of	of the use of resources		
conducts laboratory and field	resources and the proper disposal or			
investigations using safe,	recycling of materials			
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) The student, for at least	(B) demonstrate an understanding of	(2) demonstrate an understanding		
40% of instructional time,		of the conservation of resources		
conducts laboratory and field	resources and the proper disposal or	of the conservation of resources		
investigations using safe,	recycling of materials			
environmentally appropriate,	Tooyoming of materials			
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:				

Page 3 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D	esign (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(1) The student, for at least	(B) demonstrate an understanding of	(3) demonstrate an understanding		
40% of instructional time,	the use and conservation of	of the proper disposal or recycling		
conducts laboratory and field	resources and the proper disposal or	of materials		
investigations using safe,	recycling of materials			
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:				
(2) The student uses a	(A) know the definition of science	(1) know the definition of science		
systematic approach to	and understand that it has	(1) Know the definition of Science		
answer scientific laboratory	limitations, as specified in subsection			
and field investigative	(b)(1) of this section			
questions. The student is	(b)(1) of this section			
expected to:				
expected to:				
(2) The student uses a	(A) know the definition of science	(2) understand that [science] has		
systematic approach to	and understand that it has	limitations, as specified in		
answer scientific laboratory	limitations, as specified in subsection	subsection (b)(1) of this section		
and field investigative	(b)(1) of this section			
questions. The student is				
expected to:				

Page 4 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D	esign (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(2) The student uses a	` '	(1) know that scientific hypotheses		
systematic approach to	are tentative and testable statements	are tentative statements that must		
answer scientific laboratory	that must be capable of being	be capable of being supported or		
and field investigative	supported or not supported by	not supported by observational		
questions. The student is	observational evidence. Hypotheses	evidence. Hypotheses of durable		
expected to:	of durable explanatory power which	explanatory power which have been		
		tested over a wide variety of		
	of conditions are incorporated into	conditions are incorporated into		
	theories	theories		
(2) The student uses a	(B) know that scientific hypotheses	(2) know that scientific hypotheses		
systematic approach to	are tentative and testable statements	are testable statements that must		
answer scientific laboratory	that must be capable of being	be capable of being supported or		
and field investigative	supported or not supported by	not supported by observational		
questions. The student is		evidence. Hypotheses of durable		
expected to:	of durable explanatory power which	explanatory power which have been		
		tested over a wide variety of		
	of conditions are incorporated into	conditions are incorporated into		
	theories	theories		
(2) The student uses a	(C) know that scientific theories are	(1) know that scientific theories are		
systematic approach to	based on natural and physical	based on natural phenomena.		
answer scientific laboratory	phenomena and are capable of	Unlike hypotheses, scientific		
and field investigative	, , ,	theories are well-established, but		
questions. The student is	researchers. Unlike hypotheses,	may be subject to change as new		
expected to:	scientific theories are well-	areas of science and new		
	established and highly-reliable	technologies are developed		
	explanations, but may be subject to change as new areas of science and			
	new technologies are developed			
	new technologies are developed			

Page 5 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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 wellestablished and highly-reliable explanations, but may be subject to change as new areas of science and new technologies are developed	(2) know that scientific theories are based on physical phenomena. Unlike hypotheses, scientific theories are highly-reliable explanations, but may be subject to change as new areas of science and new technologies are developed		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but may be subject to	(3) know that scientific theories 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		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(D) distinguish between scientific hypotheses and scientific theories			

Page 6 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technica	l Education		
Course Title	§130.372 Scientific Research and	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(1) design investigative procedures, including making observations		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(2) design investigative procedures, including asking well-defined questions		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(3) design investigative procedures, including formulating testable hypotheses		

Page 7 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technica	I Education		
Course Title	§130.372 Scientific Research and	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(4) design investigative procedures, including identifying variables		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(5) design investigative procedures, including selecting appropriate equipment		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(6) design investigative procedures, including selecting appropriate technology		

Page 8 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technica	l Education		
Course Title	§130.372 Scientific Research and	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(7) design investigative procedures, including evaluating numerical answers for reasonableness		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(8) implement investigative procedures, including making observations		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(9) implement investigative procedures, including asking well-defined questions		

Page 9 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(10) implement investigative procedures, including formulating testable hypotheses		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(11) implement investigative procedures, including identifying variables		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(12) implement investigative procedures, including selecting appropriate equipment		

Page 10 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education				
Course Title	§130.372 Scientific Research and I	Design (One Science Credit).			
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement	
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(13) implement investigative procedures, including selecting appropriate technology			
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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	(14) implement investigative procedures, including evaluating numerical answers for reasonableness			
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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 thermometers, hot plates, lab notebooks or journals, timing devices, cameras, and meter sticks	(1) collect qualitative data			

Page 11 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(2) The student uses a	(F) collect and organize qualitative	(2) collect quantitative data		
systematic approach to	and quantitative data and make			
answer scientific laboratory	measurements with accuracy and			
and field investigative	precision using tools such as			
questions. The student is	calculators, spreadsheet software,			
expected to:	data-collecting probes, computers,			
	standard laboratory glassware,			
	microscopes, various prepared			
	slides, stereoscopes, metric rulers,			
	electronic balances, gel			
	electrophoresis apparatuses,			
	micropipettors, hand lenses, Celsius			
	thermometers, hot plates, lab			
	notebooks or journals, timing			
	devices, cameras, and meter sticks			
(2) The student uses a	(F) collect and organize qualitative	(3) organize qualitative data		
systematic approach to	and quantitative data and make			
answer scientific laboratory	measurements with accuracy and			
and field investigative	precision using tools such as			
questions. The student is	calculators, spreadsheet software,			
expected to:	data-collecting probes, computers,			
	standard laboratory glassware,			
	microscopes, various prepared			
	slides, stereoscopes, metric rulers,			
	electronic balances, gel			
	electrophoresis apparatuses,			
	micropipettors, hand lenses, Celsius			
	thermometers, hot plates, lab			
	notebooks or journals, timing			
	devices, cameras, and meter sticks			

Page 12 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and I	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(2) The student uses a	(F) collect and organize qualitative	(4) organize quantitative data		
systematic approach to	and quantitative data and make			
answer scientific laboratory	measurements with accuracy and			
and field investigative	precision using tools such as			
questions. The student is	calculators, spreadsheet software,			
expected to:	data-collecting probes, computers,			
	standard laboratory glassware,			
	microscopes, various prepared			
	slides, stereoscopes, metric rulers,			
	electronic balances, gel			
	electrophoresis apparatuses,			
	micropipettors, hand lenses, Celsius			
	thermometers, hot plates, lab			
	notebooks or journals, timing			
	devices, cameras, and meter sticks			
(2) The student uses a	(F) collect and organize qualitative	(5) make measurements with		
systematic approach to	and quantitative data and make	accuracy using tools		
answer scientific laboratory	measurements with accuracy and			
and field investigative	precision using tools such as			
questions. The student is	calculators, spreadsheet software,			
expected to:	data-collecting probes, computers,			
	standard laboratory glassware,			
	microscopes, various prepared			
	slides, stereoscopes, metric rulers,			
	electronic balances, gel			
	electrophoresis apparatuses,			
	micropipettors, hand lenses, Celsius			
	thermometers, hot plates, lab			
	notebooks or journals, timing			
	devices, cameras, and meter sticks			

Page 13 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education				
Course Title	§130.372 Scientific Research and D	Design (One Science Credit).			
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement	
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(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 thermometers, hot plates, lab notebooks or journals, timing devices, cameras, and meter sticks	(6) make measurements with precision using tools			
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(G) analyze, evaluate, make inferences, and predict trends from data	(1) analyze trends from data			
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(G) analyze, evaluate, make inferences, and predict trends from data	(2) evaluate trends from data			
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(G) analyze, evaluate, make inferences, and predict trends from data	(3) make inferences [to] trends from data			

Page 14 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education				
Course Title	§130.372 Scientific Research and D	Design (One Science Credit).			
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement	
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(G) analyze, evaluate, make inferences, and predict trends from data	(4) predict trends from data			
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(H) identify and quantify causes and effects of uncertainties in measured data	(1) identify causes of uncertainties in measured data			
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(H) identify and quantify causes and effects of uncertainties in measured data	(2) identify effects of uncertainties in measured data			
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(H) identify and quantify causes and effects of uncertainties in measured data	(3) quantify causes of uncertainties in measured data			
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(H) identify and quantify causes and effects of uncertainties in measured data	(4) quantify effects of uncertainties in measured data			

Page 15 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical	Education		
Course Title	§130.372 Scientific Research and D	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(I) organize and evaluate data and make inferences from data, including the use of tables, charts, and graphs	(1) organize data		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(I) organize and evaluate data and make inferences from data, including the use of tables, charts, and graphs	(2) evaluate data		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(I) organize and evaluate data and make inferences from data, including the use of tables, charts, and graphs	(3) make inferences from data, including the use of tables		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(I) organize and evaluate data and make inferences from data, including the use of tables, charts, and graphs	(4) make inferences from data, including the use of charts		
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(I) organize and evaluate data and make inferences from data, including the use of tables, charts, and graphs	(5) make inferences from data, including the use of graphs		

Page 16 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(2) The student uses a systematic approach to answer scientific laboratory and field investigative questions. The student is expected to:	(J) communicate valid conclusions supported by the data through various methods			
(3) 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	(1) in all fields of science, analyze scientific explanations by using empirical evidence, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		
(3) 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	(2) in all fields of science, analyze scientific explanations by using logical reasoning, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		

Page 17 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D	esign (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(3) 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	(3) in all fields of science, analyze scientific explanations by using experimental testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		
(3) 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	(4) in all fields of science, analyze scientific explanations by using observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		
(3) 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	(5) in all fields of science, evaluate scientific explanations by using empirical evidence, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		

Page 18 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D			
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(3) 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	(6) in all fields of science, evaluate scientific explanations by using logical reasoning, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		
(3) 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	(7) in all fields of science, evaluate scientific explanations by using experimental testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		
(3) 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	(8) in all fields of science, evaluate scientific explanations by using observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		

Page 19 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(3) 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	(9) in all fields of science, critique scientific explanations by using empirical evidence, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		
(3) 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	(10) in all fields of science, critique scientific explanations by using logical reasoning, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		
(3) 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	(11) in all fields of science, critique scientific explanations by using experimental testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		

Page 20 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical	Education		
Course Title	§130.372 Scientific Research and D	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(3) 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	(12) in all fields of science, critique scientific explanations by using observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student		
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials	(1) communicate scientific information extracted from various sources		
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials	(2) apply scientific information extracted from various sources		
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(C) draw inferences based on data related to promotional materials for products and services	(1) draw inferences based on data related to promotional materials for products		

Page 21 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical	Education		
Course Title	§130.372 Scientific Research and I			
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(C) draw inferences based on data related to promotional materials for products and services	(2) draw inferences based on data related to promotional materials for services		
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(D) explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society	(1) explain the impacts of the scientific contributions of a variety of historical scientists on scientific thought		
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(D) explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society	(2) explain the impacts of the scientific contributions of a variety of historical scientists on scientific society		
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(D) explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society	(3) explain the impacts of the scientific contributions of a variety of contemporary scientists on scientific thought		
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(D) explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society	(4) explain the impacts of the scientific contributions of a variety of contemporary scientists on scientific society		

Page 22 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education				
Course Title	§130.372 Scientific Research and D	esign (One Science Credit).			
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement	
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(E) research and describe the connections between science and future careers	(1) research the connections between science			
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(E) research and describe the connections between science and future careers	(2) research the connections between future careers			
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(E) research and describe the connections between science and future careers	(3) describe the connections between science			
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(E) research and describe the connections between science and future careers	(4) describe the connections between future careers			
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(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 vector addition	(1) express relationships symbolically in accordance with accepted theories to make predictions, including problems requiring proportional reasoning			

Page 23 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D	esign (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	relationships symbolically in accordance with accepted theories to make predictions and solve	(2) express relationships symbolically in accordance with accepted theories to make predictions, including problems requiring graphical vector addition		
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	accordance with accepted theories to make predictions and solve	(3) express relationships symbolically in accordance with accepted theories to solve problems mathematically, including problems requiring proportional reasoning		
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(F) express and interpret relationships symbolically in accordance with accepted theories to make predictions and solve	(4) express relationships symbolically in accordance with accepted theories to solve problems mathematically, including problems requiring graphical vector addition		
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	accordance with accepted theories to make predictions and solve	(5) interpret relationships symbolically in accordance with accepted theories to make predictions, including problems requiring proportional reasoning		

Page 24 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education				
Course Title	§130.372 Scientific Research and Design (One Science Credit).				
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement	
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(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 vector addition	(6) interpret relationships symbolically in accordance with accepted theories to make predictions, including problems requiring graphical vector addition			
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(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 vector addition	(7) interpret relationships symbolically in accordance with accepted theories to solve problems mathematically, including problems requiring proportional reasoning			
(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(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 vector addition	(8) interpret relationships symbolically in accordance with accepted theories to solve problems mathematically, including problems requiring graphical vector addition			
(4) The student formulates hypotheses to guide experimentation and data collection. The student is expected to:	(A) perform background research with respect to an investigative problem				

Page 25 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education				
Course Title	§130.372 Scientific Research and I				
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement	
(4) The student formulates hypotheses to guide experimentation and data collection. The student is expected to:	(B) examine hypotheses generated to guide a research process by evaluating the merits and feasibility of the hypotheses	(1) examine hypotheses generated to guide a research process by evaluating the merits of the hypotheses			
(4) The student formulates hypotheses to guide experimentation and data collection. The student is expected to:	(B) examine hypotheses generated to guide a research process by evaluating the merits and feasibility of the hypotheses	(2) examine hypotheses generated to guide a research process by evaluating the feasibility of the hypotheses			
(5) The student analyzes published research. The student is expected to:	(A) identify the scientific methodology used by a researcher				
(5) The student analyzes published research. The student is expected to:	(B) examine a prescribed research design and identify dependent and independent variables	(1) examine a prescribed research design			
(5) The student analyzes published research. The student is expected to:	(B) examine a prescribed research design and identify dependent and independent variables	(2) identify dependent and independent variables [of a prescribed research design]			
(5) The student analyzes published research. The student is expected to:	(B) examine a prescribed research design and identify dependent and independent variables	(3) identify independent variables [of a prescribed research design]			
(5) The student analyzes published research. The student is expected to:	(C) evaluate a prescribed research design to determine the purpose for each of the procedures performed				
(5) The student analyzes published research. The student is expected to:	(D) compare the relationship of the hypothesis to the conclusion				

Page 26 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and D	Design (One Science Credit).		
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(6) The student develops and implements investigative designs. The student is expected to:	(A) interact and collaborate with scientific researchers and/or other members of the scientific community to complete a research project	(1) interact with scientific researchers to complete a research project		
(6) The student develops and implements investigative designs. The student is expected to:	(A) interact and collaborate with scientific researchers and/or other members of the scientific community to complete a research project	(2) interact with other members of the scientific community to complete a research project		
(6) The student develops and implements investigative designs. The student is expected to:	(A) interact and collaborate with scientific researchers and/or other members of the scientific community to complete a research project	(3) collaborate with scientific researchers to complete a research project		
(6) The student develops and implements investigative designs. The student is expected to:	(A) interact and collaborate with scientific researchers and/or other members of the scientific community to complete a research project	(4) collaborate with other members of the scientific community to complete a research project		
(6) The student develops and implements investigative designs. The student is expected to:	(B) identify and manipulate relevant variables within research situations	(1) identify relevant variables within research situations		
(6) The student develops and implements investigative designs. The student is expected to:	(B) identify and manipulate relevant variables within research situations	(2) manipulate relevant variables within research situations		
(6) The student develops and implements investigative designs. The student is expected to:	(C) use a control in an experimental process			

Page 27 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education				
Course Title	§130.372 Scientific Research and Design (One Science Credit).				
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement	
(6) The student develops and	(D) design procedures to test				
implements investigative	hypotheses				
designs. The student is expected to:					
(7) The student collects,	(A) record observations and events	(1) record observations as they			
organizes, and evaluates	as they occur within an investigation	occur within an investigation			
qualitative and quantitative					
data obtained through					
experimentation. The student					
is expected to:					
(7) The student collects,	(A) record observations and events	(2) record events as they occur			
organizes, and evaluates	as they occur within an investigation	within an investigation			
qualitative and quantitative					
data obtained through					
experimentation. The student					
is expected to:					
(7) The student collects,	(B) acquire, manipulate, and analyze	(1) acquire data using equipment			
organizes, and evaluates	data using equipment and				
qualitative and quantitative	technology				
data obtained through					
experimentation. The student is expected to:					
is expected to.					
(7) The student collects,	(B) acquire, manipulate, and analyze	(2) manipulate data using			
organizes, and evaluates		equipment			
qualitative and quantitative	technology				
data obtained through					
experimentation. The student					
is expected to:					

Page 28 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education				
Course Title	§130.372 Scientific Research and Design (One Science Credit).				
TEKS (Knowledge and Skills) (7) The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to:	Student Expectation (B) acquire, manipulate, and analyze data using equipment and technology	Breakout (3) analyze data using equipment	Element	Subelement	
(7) The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to:	(B) acquire, manipulate, and analyze data using equipment and technology	(4) acquire data using technology			
(7) The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to:	(B) acquire, manipulate, and analyze data using equipment and technology	(5) manipulate data using technology			
(7) The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to:	(B) acquire, manipulate, and analyze data using equipment and technology	(6) analyze data using technology			
(7) The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to:	(C) construct data tables to organize information collected in an experiment				

Page 29 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education					
Course Title	§130.372 Scientific Research and Design (One Science Credit).					
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement		
(7) The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to:		(1) evaluate data using statistical methods to recognize patterns				
(7) The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to:	(D) evaluate data using statistical methods to recognize patterns, trends, and proportional relationships	(2) evaluate data using statistical methods to recognize trends				
(7) The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to:	(D) evaluate data using statistical methods to recognize patterns, trends, and proportional relationships	(3) evaluate data using statistical methods to recognize proportional relationships				
(8) The student knows how to synthesize valid conclusions from qualitative and quantitative data. The student is expected to:	(A) synthesize conclusions supported by research data					
(8) The student knows how to synthesize valid conclusions from qualitative and quantitative data. The student is expected to:	(B) consider and communicate alternative explanations for observations and results	(1) consider alternative explanations for observations				
(8) The student knows how to synthesize valid conclusions from qualitative and quantitative data. The student is expected to:	(B) consider and communicate alternative explanations for observations and results	(2) consider alternative explanations for results				

Page 30 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education				
Course Title	§130.372 Scientific Research and I	Design (One Science Credit).			
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement	
(8) The student knows how to synthesize valid conclusions from qualitative and quantitative data. The student is expected to:	(B) consider and communicate alternative explanations for observations and results	(3) communicate alternative explanations for observations			
(8) The student knows how to synthesize valid conclusions from qualitative and quantitative data. The student is expected to:	(B) consider and communicate alternative explanations for observations and results	(4) communicate alternative explanations for results			
(8) The student knows how to synthesize valid conclusions from qualitative and quantitative data. The student is expected to:	(C) identify limitations within the research process and provide recommendations for additional research	(1) identify limitations within the research process			
(8) The student knows how to synthesize valid conclusions from qualitative and quantitative data. The student is expected to:	(C) identify limitations within the research process and provide recommendations for additional research	(2) provide recommendations for additional research			
(9) The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to:	(A) construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology	(1) construct charts in facilitating data analysis			
(9) The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to:	(A) construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology	(2) construct tables in facilitating data analysis			

Page 31 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education			
Course Title	§130.372 Scientific Research and I			
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement
(9) The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to:	(A) construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology	(3) construct graphs in facilitating data analysis		
(9) The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to:	(A) construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology	(4) construct charts in communicating experimental results clearly using technology		
(9) The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to:	(A) construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology	(5) construct tables in communicating experimental results clearly using technology		
(9) The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to:	(A) construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology	(6) construct graphs in communicating experimental results clearly using technology		
(9) The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to:	(A) construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology	(7) construct charts in communicating experimental results effectively using technology		
(9) The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to:	(A) construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology	(8) construct tables in communicating experimental results effectively using technology		

Page 32 of 33 Updated: 10/22/2012

Subject	Chapter 130. Career and Technical Education					
Course Title	§130.372 Scientific Research and I	§130.372 Scientific Research and Design (One Science Credit).				
TEKS (Knowledge and Skills)	Student Expectation	Breakout	Element	Subelement		
conclusions clearly and	(A) construct charts, tables, and graphs in facilitating data analysis and in communicating experimental results clearly and effectively using technology	(9) construct graphs in communicating experimental results effectively using technology				
conclusions clearly and concisely to an audience of	(B) suggest alternative explanations from observations or trends evident within the data or from prompts provided by a review panel					

Page 33 of 33 Updated: 10/22/2012