§130.25. Advanced Plant and Soil Science (One Credit), Adopted 2015.	
. (b) Introduction.	
. (5) 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.	**Edit: "… are descriptive, comparative, or experimental."**
. (c) Knowledge and skills.	
. (3) The student uses scientific methods and equipment during laboratory and field investigations. 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, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;	(3)(F) Delete "gel electrophoresis apparatuses, micropipettors, and hot plates". **ADD** tools that pertain to soil science. **"…s.oil samples, soil sampling shovels, soil analysis kits, sifters"**
. (4) 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)(A) Edit: "…logical reasoning, and descriptive and experimental testing,.."**
~~. (7) The student develops scenarios for advances in plant and soil science. The student is expected to:~~	**(7) section – all (A), (B), (C), (D) - Delete. Found in process intro section.**
~~(A) design, conduct, and complete research in a laboratory or field investigation to solve problems in plant and soil science;~~	
~~(B) use charts, tables, and graphs to prepare written summaries of results and data obtained in a laboratory or field investigation;~~	
~~(C) organize, analyze, evaluate, make inferences, and predict trends from data obtained in a laboratory or field investigation; and~~	
~~(D) communicate valid outcomes and solutions.~~	
. (11) The student describes the origin and use of water in a watershed. The student is expected to:	**(11)(B) - Replace: "Identify and analyze the type and quality or water in a watershed;"**
. (B) **research and identify the type of water used in a watershed**;	
. (C) ~~analyze water quality in a watershed; and~~	(11)(C) - **Delete** (C), in (B).

. (17) The student diagrams the structure and function of nucleic acids in the mechanism of genetics. The student is expected to: . (C) **compare and contrast genetic variations observed in plants and animals; and** . (D) compare the processes of mitosis and meiosis and their significance. . . (18) The student demonstrates skills related to the human, scientific, and technological dimensions of crop production and the resources necessary for producing domesticated plants. The student is expected to: . (D) design and conduct **experiments** to support known principles of genetics.	**(17)(C) - Replace: "Compare the processes of mitosis and meiosis and the significance in genetic variations observed in organisms." DELETE (D), now included in (C).** **(18)(D) - Edit - change experiments to "investigations"**
§130.224. Anatomy and Physiology (One Credit), Adopted 2015. . (a) General requirements. This course is recommended for students in Grades 10-12. Prerequisite: **<u>two science credits</u>**. Recommended prerequisite: a course from the Health Science Career Cluster. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Students shall be awarded one credit for successful completion of this course. . (b) Introduction. . (5) 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. (c) Knowledge and skills. . (4) 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 **<u>experimental and observational testing</u>**, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking;	**Edit: "Biology, Chemistry or Integrated Physics and Chemistry (IPC) or Physics"** **Edit: "... are descriptive, comparative, or experimental."** **Edit "descriptive, comparative or experimental" testing**

§130.225. Medical Microbiology (One Credit), Adopted 2015.	**Edit: "One Half to One Credit" – Allow district flexibility** *Note: This course only has 7 Knowledge/Skill statements with Student Expectations. It is way below the other courses. Yet the writing team recommended it be increased to a full-year course. Do not concur.*
(b) Introduction.	
. (5) 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.	**Edit: "descriptive, comparative or experimental."**
. (c) Knowledge and skills.	
. (4) 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;	**Edit "and descriptive, comparative or experimental testing..."**
. (6) The student is expected to perform and analyze results in the microbiology laboratory. The student is expected to:	
. (H) interpret **the** Gram stain results;	**Delete "the"**
. (7) The student examines the role of microorganisms in infectious diseases. The student is expected to:	
. (A) outline the infectious process, including how pathogenic microorganisms affect the human body **system**;	**Edit "systems"**

§130.227. Pathophysiology (One Credit), Adopted 2015.	**Edit: "One Half to One Credit" – Allow district flexibility**
. (b) Introduction.	
. (5) 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.	**Edit "descriptive, comparative, or experimental."**
. (c) Knowledge and skills.	
. (4) 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;	**Edit "descriptive, comparative or experimental testing"**
§130.339. Forensic Science (One Credit), Adopted 2015.	
(b) Introduction.	
. (5) Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation can be **experimental, descriptive, or comparative**. The method chosen should be appropriate to the question being asked. (c) Knowledge and skills.	**Edit "descriptive, comparative, or experimental."**
. (4) 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) 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, to encourage critical thinking;	**Edit "descriptive, comparative, or experimental testing"**
. (7) The student recognizes the methods to process and analyze trace evidence commonly found in a crime scene. The student is expected to:	
. (A) demonstrate how to process trace evidence **such as** glass, paint, fibers, and hair collected in a simulated crime scene;	**Edit - "such as soil, grass, blood,..."**

§130.412. Engineering Design and Problem Solving (One Credit), Adopted 2015.	
. (a) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisites: Algebra I and Geometry. Recommended prerequisites: **two Science, Technology, Engineering, and Mathematics (STEM) Career Cluster credits**. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Students shall be awarded one credit for successful completion of this course.	**Edit: "Biology, Chemistry or Integrated Physics and Chemistry (IPC) or Physics."**
. (b) Introduction.	**Edit "descriptive, comparative, or experimental."**
. (7) 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.	
(c) Knowledge and skills.	**Delete "engineering" (not necessary)**
. (2) The student, for at least 40% of instructional time, conducts **engineering** laboratory and field activities using safe, environmentally appropriate, and ethical practices. The student is expected to:	**Delete "engineering (not necessary)**
. (A) demonstrate safe practices during **engineering** laboratory and field activities; and	
§130.10. Advanced Animal Science (One Credit), Adopted 2015.	
(a) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisites: **Biology, Chemistry, or Integrated Physics and Chemistry (IPC);** Algebra I and Geometry; and either Small Animal Management, Equine Science, or Livestock Production. Recommended prerequisite: Veterinary Medical Applications. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Students shall be awarded one credit for successful completion of this course.	**Edit: "Biology, Chemistry or Integrated Physics and Chemistry (IPC) or Physics'**

§130.414. Engineering Science (One Credit), Adopted 2015.	***** The course "Principles of Engineering" (old name) is really a Project Lead the Way course, which is a copyrighted program. These TEKS mirror the PLTW course**
***** The course "Principles of Engineering" (old name) is really a Project Lead the Way course, which is a copyrighted program. These TEKS mirror the PLTW course. *****	*in many respects. There is also another course in Batch B, "Engineering Design and Problem Solving" that offers science grad credit.*
. (a) General requirements. This course is recommended for students in Grades 10-12. Prerequisite: Algebra I and **one credit of high school science**. Recommended prerequisite: Geometry. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Students shall be awarded one credit for successful completion of this course.	**Edit: "Biology, Chemistry, Integrated Physics and Chemistry (IPC) or Physics"**
. (b) Introduction.	
. (5) 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.	**Edit: "descriptive, comparative, or experimental"**
(c) Knowledge and skills.	
. (4) 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;	**Edit: "descriptive, comparative, and experimental testing"**
. (7) The student understands mechanisms, including simple and compound machines, and performs calculations related to mechanical advantage, drive ratios, work, and power. The student is expected to:	
. (A) **explain how components, including gears, sprockets, pulley systems, and** simple machines, make up mechanisms;	**Edit: (7)(A) "explain the purpose and operation of components, including gears, sprockets, pulley systems, and…"**
.	
. (8) The student understands energy sources, energy conversion, and circuits and performs calculations related to work and power. The student is expected to:	
. (D) define voltage, current, and resistance **and calculate each using Ohm's law**.	**Edit: "and calculate each quantity in series, parallel, and combination electrical circuits using Ohm's Law"**
. (9) The student understands system energy requirements and how energy sources can be combined to convert energy into useful forms. The student understands the relationships among material conductivity, resistance, and geometry in	

order to calculate energy transfer and determine power loss and efficiency. The student is expected to:	
(F) ana**lyze how thermal energy transfer is affected by conduction, R-values, and radiation; and**	**Edit**: "analyze how thermal energy transfer is affected by conduction, thermal resistance R values, convection, and radiation."
(10) The student understands the interaction of forces acting on a body and performs calculations related to structural design. The student is expected to:	
(A) **illustrate, calculate, and experimentally measure all forces acting upon a given body;**	Edit to "understand the definition of a force according to Newton's Second Law of Motion and the four general types of forces: weight (force due to gravity),
(11) The student understands material properties and the importance of choosing appropriate materials for design. The student is expected to:	
(B) calculate **and measure** the weight, volume, mass, density, and surface area of selected common household products; and	**Edit – delete "and measure" Calculate takes into account measurement.**
(12) The student uses material testing to determine a product's function and performance. The student is expected to:	
(E) **identify and compare measurements and calculations of** sample material properties such as elastic range, proportional limit, modulus of elasticity, elastic limit, resilience, yield point, plastic deformation, ultimate strength, failure, and ductility using stress-strain data points.	**Edit; replace "identify and compare measurements and calculations of sample" with "identify and calculate sample…"**
(14) The student demonstrates an understanding of fluid power systems and calculates values in a variety of systems. The student is expected to:	
(C) use Pascal's Law to calculate values in a fluid power **system**;	**Edit: "system, including force, mass, and cross-sectional area"**
(E) calculate values in a pneumatic system using the **ideal gas laws**; and	**Edit: "…ideal gas laws using pressure, volume, and temperature"**
(16) The student demonstrates an understanding of kinematics in one and two dimensions and applies the concepts to real-world engineering design problems. The student is expected to:	
(C) calculate the **X and Y components of a projectile motion**; and	**Edit:** "X and Y components of an object in projectile motion."

§130.415. Biotechnology I (One Credit), Adopted 2015.

. (a) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisite: **Biology**. ~~Recommended prerequisites: Principles of Biosciences and Chemistry~~. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Students shall be awarded one credit for successful completion of this course.	**Edit: "Biology and Chemistry"**
. (b) Introduction.	
. (5) Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation can be **experimental, descriptive, or comparative**. The method chosen should be appropriate to the question being asked.	**Edit "descriptive, comparative, or experimental."**
(c) Knowledge and skills.	
. (2) The student, for at least 40% of instructional time, conducts ……..	
. (D) maintain required safety training, including location and understanding of interpretation of **material safety data sheets**;	**Delete "material" (MSDSs are now called safety data sheets)**
. (4) 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;	**Edit "descriptive, comparative, or experimental."**
. (5) The student explores the emerging field of biotechnology. The student is expected to:	
. (B) apply scientific processes and concepts outlined in the Texas essential knowledge and skills (TEKS) for Biology relevant to **biotechnology**;	**Edit: "...biotechnology, including all types of cells; cellular structures and functions; and viruses."**
.	
. (7) The student understands the role of genetics in the biotechnology industry. The student is expected to:	
. (B) describe the structure and function of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) in **eukaryotic and prokaryotic cells**;	**(B) Replace "eukaryotic and prokaryotic cells" with "cells and viruses;"**
. (8) The student analyzes the importance of recombinant DNA technology and genetic engineering. The student is expected to:	
. (G) distinguish **between** vectors commonly used in biotechnology for DNA insertion, including plasmids, retroviruses, and **bacteriophage**; and	**Edit "between" to "among" Edit "bacteriophages;"**

.	
. (11) The student **prepares solutions** and reagents for the biotechnology laboratory. The student is expected to:	**Edit: "...prepares and properly labels solutions..."**
.	
. (12) The student performs advanced biotechnology laboratory procedures. The student is expected to:	
. (B) **isolate**, maintain, and store **bacterial** cultures;	**Edit "safely isolate …. Store microbial cultures;"**
§130.416. Biotechnology II (One Credit), Adopted 2015.	
. (b) Introduction.	
. (5) 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.	**Edit "descriptive, comparative, or experimental."**
. (c) Knowledge and skills.	
. (4) 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;	**Edit "descriptive, comparative, or experimental testing"**
. (5) The student formulates hypotheses to guide **experimentation** and data collection. The student is expected to:	**Edit – change experimentation to "investigation"**
. (6) The student analyzes published research. The student is expected to:	
(B) examine a **prescribed research design** and identify dependent and independent variables;	**Edit "a prescribed research design" to "comparative and experimental investigations"**
(D) **compare the relationship of the hypothesis to the conclusion**.	**Replace: "determine if the data and conclusion support the hypothesis"**
. (7) The student develops and **implements investigative** designs. The student is expected to:	**Edit "implements appropriate investigative"**

. (8) The student collects, organizes, and evaluates qualitative and quantitative data obtained through experimentation. The student is expected to:	
(B) record observations as they occur within an investigation;	**Edit sequence: change B-C-D-E-F to C-D-E-F-B**
(C) acquire, manipulate, and analyze data using appropriate equipment and technology, following the rules of significant digits;	**--- new sequence**
(D) identify sources of random error and systematic error and differentiate between both types of error;	**--- new sequence**
. (E) report error of a set of measured data in various formats, including standard deviation and percent error;	**--- new sequence**
. (F) construct data tables to organize information collected in an experiment; and	**--- new sequence**
. (G) evaluate data using statistical methods to recognize **patterns, trends, and proportional relationships.**	**Edit: " …patterns, trends, and proportional/ comparative or causal relationships."**
.	
~~. (10) The student communicates conclusions clearly and concisely to an audience of professionals. The student is expected to:~~	**Delete – redundant**
~~(A) construct charts, tables, and graphs using technology in order to facilitate data analysis and to communicate experimental results clearly and effectively, including oral presentation of original findings of a research project to an audience of peers and professionals; and~~	**Delete – redundant**
~~(B) suggest alternative explanations from observations or trends evident within the data or from prompts provided by a review panel.~~	**Delete - redundant**

§130.417. Scientific Research and Design (One Credit), Adopted 2015.	
. (a) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisite: **one credit of high school science**. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Students shall be awarded one credit for successful completion of this course.	**Edit "Biology, Chemistry, Integrated Physics and Chemistry (IPC), or Physics."**
. (b) Introduction.	
. (5) 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.	**Edit "descriptive, comparative, or experimental"**
(c) Knowledge and skills.	
. (4) 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;	**Edit "descriptive, comparative, and experimental testing"**
FOOD ~~CHEMISTRY~~ SCIENCE	**FOOD CHEMISTRY**
	Title: Edit "Food Science"
	Change name back to **Food Science** Majority of content is applied general science, not chemistry focused.
(b) **Introduction.**	
(b)(7) Scientific inquiry. Food 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.	(b)(7) Edit order: "...**descriptive, comparative, or experimental."**
(3) The student uses scientific methods **processes** and equipment during laboratory and field …..	(3) - Change back to "**methods**" to be consistent with best practices and other courses.
(6)	(6)(D) - Change "organisms " to "microorganisms."
	(6)(E) – Edit "analyze and practice ..."

(7)	(7)(A) - delete "related to food science"
(8)	(8)(E) - should be "relationships among the ..."
(9)	(9)(A) - delete "of food"
	(9)(C) – Edit – "…in digestion, including the factors that influence enzyme activity"
(10)	(10)(B) - should be "assess"
	(10)(C) - Delete. Redundant from first process section
(11)	(11)(A), (B), (C) - Delete "in baked products"
(12)	(12)(C) – Edit "Investigate regulations of the agencies …"
	(12)(D) – Delete, part of process section
(13)	(13) – Return to original text
	(13)(C) – Edit "investigate the role of latent heat in phase changes …"
	(13)(D) - (D) Return to original language. New text makes no sense
	(13)(E) and (F) - Delete - in process section
(14)	(14) – Edit "carbohydrates in food ..."
	Old (14)(C) – Keep original text, do not delete
	(14)(F) - Delete - in process section
(15)	(15) - '"…properties of fats in food" …. food production "and role in maintaining optimum health"

(16)	(16) - Delete "and amino acids" (16) – Edit – ""... effects in food production and role in maintaining optimum: health" (16)(A) and (B) and (G) – Delete
(17)	(17) – Edit – "…in food production and maintaining optimum health" (17)(A) – Edit "identity and discuss the function ..." …. "… in food production and maintaining optimum health" (17)(D) – Delete. In process section.
(18)	(18) – Edit "…in food production and maintaining optimum health" (18)(D) - AD "… and create a food product" (18)(E) and (F) – Delete. In process section.
(20)	(20)(D) - Return to "describe" (instead of investigate)
(21)	(21)(B) – Edit "... and create a food product using dehydration" (21)(C) – Edit "... and create a food product using canning" (21)(D) – Edit "... and create a food product using freezing" (21)(E) and (F) and (G) – Delete. In process section.

§130.404. Principles of Technology (One Credit), Adopted 2015.	
. (b) Introduction.	
. (5) 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.	**Edit: "descriptive, comparative, or experimental"**
(c) Knowledge and skills.	
. (4) 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;	**Edit: "descriptive, comparative, and experimental testing"**
. (7) The student uses critical-thinking, scientific-reasoning, and problem-solving skills. The student is expected to:	**THIS SECTION IS A REPEAT**
. (A) analyze and evaluate scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing;	**REPEAT**
. (B) communicate and apply scientific information;	**REPEAT …**
. (C) explain the societal impacts of scientific contributions; and	
. (D) research and describe the connections between technologies and future career opportunities.	
. (12) The student analyzes the properties of wave motion and optics. The student is expected to:	
. (B) investigate and analyze characteristics of waves, **including velocity**, frequency, amplitude, and wavelength;	**Edit: "including period, velocity …."**
. (C) investigate and calculate the relationship between **wavespeed**, frequency, and wavelength;	**Edit: should be wave speed (2 words)**
. (E) investigate behaviors of waves, including reflection, refraction, diffraction, interference, **resonance, and** the Doppler effect;	**Edit: "…resonance, polarization, and ..."**
.	
(13) The student analyzes the concepts of atomic, nuclear, and quantum phenomena. The student is expected to:	**(13)(D) ADD "(D) describe the process of radioactive decay given an isotope and half-life." (very important to 13).**
. **(D) INSERT NEW STUDENT EXPECTATION**	