Advanced Plant and Soil Science TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
First Six Weeks	
Orientation	1 day
Professional Standards/Employability Skills APS 1(A) The student will identify career development and entrepreneurship opportunities in the field of plant systems. APS 1(B) The student will apply competencies related to resources, information, interpersonal skills, and systems of operation in plant systems. APS 1(C) The student will demonstrate knowledge of personal and occupational safety practices in the workplace. APS 1(D) The student will identify employer expectations and appropriate work habits. APS 1(E) The student will demonstrate characteristics of good citizenship, including advocacy, stewardship, and community leadership.	5 days
Lab and Field Investigation **Safe, Environmental and Ethical Practices** APS 2(A) The student will demonstrate safe practices during field and laboratory investigations. APS 2(B) The student will demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials. **Scientific Measurement** FS 3(E) The student will plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology. **Data Collection & Recording** APS 3(F) The student will 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, analysis kits, sieve sets, sieve shakers, soil augers, soil moisture meters, hand lenses, Celsius thermometers, 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. APS 3(G) The student will analyze, evaluate, make inferences, and predict trends from data. APS 3(H) The student will 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. **Develop Agriculture Experience** APS 5(A) The student will plan, propose, conduct, document, and evaluate	12 days (70 hrs) ongoing

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a supervised agriculture experience program as an experiential learning activity. APS 5(B) The student will apply proper record-keeping skills as they relate to the supervised agriculture experience. APS 5(C) The student will participate in youth leadership opportunities to create a well-rounded experience program. APS 5(D) The student will produce and participate in a local program of activities using a strategic planning process. **Analyze Plant & Soil Science** APS 6(A) The student will explain the importance and interrelationship of soil and plants. APS 6(B) The student will practice soil and plant evaluation as it applies to agricultural and urban settings. **Develops Scenarios for Advances in Plant & Soil - Microscopes** APS 7(A) The student will design, conduct, and complete research in a laboratory or field investigation to solve problems in plant and soil science. APS 7(B) The student will use charts, tables, and graphs to prepare written summaries of results and data obtained in a laboratory or field investigation. APS 7(C) The student will organize, analyze, evaluate, make inferences, and predict trends from data obtained in a laboratory or field investigation. APS 7(D) The student will communicate valid outcomes and solutions.	
Scientific Method and Equipment APS 3(A) The student will know the definition of science and understand that it has limitations, as specified in subsection (b)(4) of this section. APS 3(B) The student will know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories. **Scientific Method** APS 3(C) The student will 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. APS 3(D) The student will distinguish between scientific hypotheses and scientific theories. **Data Collection & Recording** APS 3(F) The student will 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, analysis kits, sieve sets,	5 days

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sieve shakers, soil augers, soil moisture meters, hand lenses, Celsius thermometers, 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. APS 3(G) The student will analyze, evaluate, make inferences, and predict trends from data. APS 3(H) The student will 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.	
Scientific Reasoning, Critical Thinking & Problem Solving APS 4(A) The student will 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. APS 4(B) The student will communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials. APS 4(C) The student will draw inferences based on data related to promotional materials for products and services. APS 4(D) The student will evaluate the impact of scientific research on society and the environment. APS 4(E) The student will evaluate models according to their limitations in representing biological objects or events. APS 4(F) The student will research and describe the history of biology and contributions of scientists.	5 days
Second Six Weeks	
Habitats and Ecosystems APS 8(A) The student will identify native and introduced plants, assess their role in an ecosystem, and compare them to plants in other ecosystems. APS 8(B) The student will make observations and compile data about fluctuations in abiotic cycles and evaluate their effects on local ecosystems. APS 8(C) The student will evaluate the impact of human activity such as pest control, hydroponics, and sustainable agriculture on ecosystems. APS 8(D) The student will predict how the introduction, removal, or re-introduction of an organism may affect the food chain and existing populations.	10 days
Lab and Field Investigation.	5 days
Soil Genesis APS 9(A) The student will explain soil formation.	5 days

Advanced Plant and Soil Science TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
APS 9(B) The student will evaluate the properties and nature of soils. APS 9(C) The student will recognize the importance of conservation of soil and agencies involved in conservation. APS 9(D) The student will recognize the application of soil mechanics to engineering and excavation operations. APS 9(E) The student will perform soil management practices such as tillage trials and sustainable soil management practices. APS 9(F) The student will practice soil evaluations related to experiential activities such as land judging.	
Lab and Field Investigation.	5 days
Third Six Weeks	
Soil Genesis continues APS 9(A) The student will explain soil formation. APS 9(B) The student will evaluate the properties and nature of soils. APS 9(C) The student will recognize the importance of conservation of soil and agencies involved in conservation. APS 9(D) The student will recognize the application of soil mechanics to engineering and excavation operations. APS 9(E) The student will perform soil management practices such as tillage trials and sustainable soil management practices. APS 9(F) The student will practice soil evaluations related to experiential activities such as land judging. **Soil Formation** APS 12(A) The student will illustrate the role of weathering in soil formations. APS 12(B) The student will distinguish chemical weathering from mechanical weathering. APS 12(C) The student will identify geological formations that result from differing weathering processes.	15 days
Lab and Field Investigation.	10 days
Fourth Six Weeks	
Environmental Systems and Conservation APS 10(A) The student will summarize methods of land use and management. APS 10(B) The student will identify sources, use, quality, and conservation of water. APS 10(C) The student will explore the use and conservation of renewable and non-renewable resources.	10 days

Advanced Plant and Soil Science TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
APS 10(D) The student will analyze and evaluate the economic significance and interdependence of components of the environment. APS 10(E) The student will evaluate the impact of human activity and technology on soil fertility and productivity. APS 10(F) The student will analyze and describe the effects on environments of events such as fire, hurricanes, deforestation, mining, population growth, and urban development. APS 10(G) The student will explain how regional changes in the environment may have a global effect. **Petroleum Energy Resources** APS 14(A) The student will research and describe the origin of fossil fuels such as coal, oil, and natural gas. APS 14(B) The student will analyze issues regarding the use of fossil fuels and other non-renewable energy sources or alternative energy sources. APS 14(C) The student will analyze the significance and economic impact of the use of fossil fuels and alternative energy sources. **Energy Sources** APS 20(A) The student will summarize forms and sources of energy. APS 20(B) The student will explain the flow of energy in an environment. APS 20(C) The student will investigate and explain the effects of energy transformations in an ecosystem. APS 20(D) The student will investigate and identify energy interaction in an ecosystem.	
Lab and Field Investigation.	5 days
Origin and Use of Watersheds APS 11(A) The student will identify sources and calculate the amount of water in a watershed, including ground and surface water. APS 11(A) The student will research and identify the type of water used in a watershed. APS 11(A) The student will analyze water quality in a watershed. APS 11(A) The student will identify and use methods to evaluate water quantity available in a watershed.	5 days
Lab and Field Investigation.	5 days
Watersheds Dynamics APS 13(A) The student will identify the characteristics of a local watershed such as average annual rainfall, runoff patterns, aquifers, location of water basins, and surface reservoirs. APS 13(B) The student will analyze the impact of floods, drought, irrigation, urbanization, and industrialization in a watershed.	5 days
Lab and Field Investigation.	2 days

Advanced Plant and Soil Science TEKS/LINKS – Student Objectives One Credit	Suggested Time Ranges
Fifth Six Weeks	
Plant Science - Crop Production APS 15(A) The student will analyze plant physiology, genetics, and reproduction of various crops. APS 15(B) The student will recognize characteristics related to seed quality such as mechanical damage, viability, and grade. APS 15(C) The student will identify plant pests and diseases and their causes, prevention, and treatment. APS 15(D) The student will perform plant management practices such as germination tests, plant spacing trials, and fertilizer tests. APS 15(E) The student will measure trends in crop species and varieties grown locally in Texas and the United States and how they affect agriculture and consumers.	10 days
Lab and Field Investigation.	7 days
Producing Domesticated Plants APS 18(A) The student will describe the growth and development of major crops. APS 18(B) The student will apply principles of genetics and plant breeding. APS 18(C) The student will examine the development of crop varieties through the origin of agriculture. APS 18(D) The student will design and conduct investigations to support known principles of genetics.	10 days
Lab and Field Investigation.	7 days
Sixth Six Weeks	
Plant Form and Function APS 16(A) The student will compare cells from different parts of the plant, including roots, stems, and leaves, to show specialization of structures and functions. APS 16(B) The student will sequence the levels of organization in multicellular organisms that relate the parts to each other and the whole. **Plant Chemistry** APS 19(A) The student will compare the structures and functions of different types of organic molecules such as carbohydrates, lipids, proteins, and nucleic acids. APS 19(B) The student will compare the energy flow in photosynthesis to the energy flow in cellular respiration. APS 19(C) The student will investigate and identify the effect of enzymes on plant cells.	10 days

Advanced Plant and Soil Science TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
Lab and Field Investigation.	6 days
Genetics APS 17(A) The student will describe components of deoxyribonucleic acid (DNA) and illustrate how information for specifying the traits of an organism is carried in DNA. APS 17(B) The student will identify and illustrate how changes in DNA cause phenotypic or genotypic changes. APS 17(C) The student will compare and contrast genetic variations observed in plants and animals. APS 17(D) The student will compare the processes of mitosis and meiosis and their significance.	10 days
Lab and Field Investigation.	6 days