



OREGON
DEPARTMENT OF
EDUCATION

Agriculture, Food, Natural Resources

Statewide Program of Study: Agriculture Career Cluster

Knowledge and Skill Statements/Performance Indicators

Employability | Career Cluster | Focus Areas

- Agribusiness Systems
- Animal Systems
- Food Products & Processing Systems
- Plant Systems
- Power, Structural & Technology Systems

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Contents

Overview	1
Agriculture Career Cluster Knowledge and Skill Statements	3
Employability Knowledge and Skill Statements with Suggested Performance Indicators	5
Agriculture, Food & Natural Resource Sector Skills Career Cluster Knowledge and Skill Statements with Suggested Performance Indicators	7
Agriculture Career Cluster Knowledge and Skill Statements with Suggested Performance Indicators	13
Animal Systems Knowledge and Skill Statements with Suggested Performance Indicators	17
Food Products & Processing Knowledge and Skill Statements with Suggested Performance Indicators	21
Plant Systems Knowledge and Skill Statements with Suggested Performance Indicators ...	25
Power, Structural & Technology Systems Knowledge and Skill Statements with Suggested Performance Indicators	30

Overview

The Statewide Program of Study for Agriculture is designed to prepare students for entry-level employment in a range of careers across the industry and/or to pursue advanced postsecondary educational studies. The cluster encompasses five program areas from the pre-existing skill statements cluster that were incorporated into five focus areas: (1) Agribusiness Systems, (2) Animal Systems, (3) Food Products & Processing Systems, (4) Plant Systems, and (5) Power, Structural & Technology Systems.

This document summarizes the technical skills that a student completing a career and technical education (CTE) Program of Study might be expected to know and be able to do. When reading the document, note that:

- ***A Program of Study spans secondary and postsecondary education***, meaning that students are expected to master the identified skills during high school or at an affiliated community college. It is not expected that all skills will be taught at the high school level.
- ***Knowledge and Skill Statements*** (indicated in bold) summarize the types of skills to be taught in a specific focus area. Educators are expected to address these skill statements as part of their CTE Program of Study.
- ***Suggested Performance Indicators*** illustrate tasks that students might perform to demonstrate their understanding of each skill statement. They are offered as examples and are not required to be taught.

Faculty in Oregon community colleges offering related industry training were asked to rate the relative importance of each skill and indicator for high school graduates entering a community college after having completed a CTE Program of Study offered at the secondary level. These ratings included:

- **Critically important:** This skill would be expected of students continuing their studies at a community college offering related programming or entering the workforce after having completed a CTE Program of Study at the high school level.
- **Somewhat important:** This skill would be useful but not necessary for students continuing their studies at a community college offering related programming or entering the workforce after having completed a CTE Program of Study at the high school level.
- **Not important:** This skill would not be expected of students continuing their studies at a community college or entering the workforce after having completed a CTE Program of Study at the high school level (i.e., it will be taught in college or on the job).

How to Use This Document

Educators offering a CTE Program of Study in the Agriculture Career Cluster should review the Knowledge and Skill Statements and Suggested Performance Indicators in this document. Three types of skills and indicators are provided:



Employability Knowledge and Skills — Applicable to all Career Clusters

All learners are expected to master these basic skills to function in the workplace. These cross-cutting abilities, found in all jobs in all industries, encompass a broad range of

communication, critical thinking, interpersonal, and organizational skills imperative for career success.



Career Cluster-Level Knowledge and Skills — *Applicable to all careers in the Agriculture Cluster*

All workers in Agriculture are expected to have a broad understanding of the field. These cross-cutting skills prepare workers to succeed in a range of jobs in the cluster. High school students mastering these skills are prepared to enter college or the workforce with an understanding of their career options and training needs.



Focus Area-Level Knowledge and Skills — *Applicable to a specific career area*

Field-specific knowledge that an entering college student or entry-level worker would be expected to possess. High school students mastering these skills are prepared to enroll in college to pursue advanced training or enter employment prepared to succeed. Postsecondary graduates would be prepared to enter employment with a credential, certificate, or degree.

These skills have been classified based on the level of knowledge required for their mastery:

- *Foundational Skills* describe technical skills that all high school students completing a Program of Study would be expected to master. Ideally, these skills would be taught within a high school CTE Program of Study (or in collaboration with a postsecondary partner if it is not feasible within high school).
- *Intermediate Skills* describe more technically advanced skills that high school instructors are encouraged to teach in a CTE Program of Study, though some might be taught at a partnering community college due to equipment or time constraints.
- *Advanced Skills* describe highly technical skills that high school instructors may choose to teach with the understanding that, due to their complexity, most will be taught by community college faculty in the postsecondary component of a CTE Program of Study.

Each Knowledge and Skill Statement includes a list of Suggested Performance Indicators that illustrate how students might demonstrate their understanding or abilities relating to each statement. These indicators are offered as an optional, industry-suggested, community college faculty-vetted way to demonstrate the Knowledge and Skill Statements. They are **not** required.

Educators may choose to select from these indicators and/or design other means for students to show skill mastery in their CTE Program of Study. It is anticipated that secondary and postsecondary educators will collaborate in selecting the number, type, and technical specificity of Suggested Performance Indicators, as well as the educational level at which they will be taught.

For more detailed information, see the Agriculture Resource Guide on the Oregon Department of Education website.

Agriculture Career Cluster Knowledge and Skill Statements

Employability Knowledge and Skills

These Knowledge and Skill Statements apply to all Career Clusters in Oregon.

EMP-01	Adhere to workplace practices
EMP-02	Exhibit personal responsibility and accountability
EMP-03	Practice cultural competence
EMP-04	Demonstrate teamwork and conflict resolution
EMP-05	Communicate clearly and effectively
EMP-06	Employ critical thinking to solve problems
EMP-07	Demonstrate creativity and innovative thinking
EMP-08	Demonstrate fluency in workplace technologies
EMP-09	Plan, organize, and manage work
EMP-10	Make informed career decisions

Career Cluster-Level Knowledge and Skills

These Knowledge and Skill statements apply for all of the Agriculture Programs of Study in Oregon.

Sector_Skills-01	Analyze how issues, trends, technologies, and public policies impact systems in the Agriculture, Food & Natural Resources Career Clusters.
Sector_Skills-02	Evaluate the nature and scope of the Agriculture, Food & Natural Resources Career Clusters and the role Agriculture, Food & Natural Resources play in society and the economy, both domestically and internationally.
Sector_Skills-03	Examine and summarize importance of health, safety, and environmental management systems in AFNR organizations.
Sector_Skills-04	Demonstrate stewardship of natural resources in AFNR activities.
Sector_Skills-05	Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources Career Pathways.
Sector_Skills-06	Analyze the interaction among AFNR systems in the production, processing and management of food, fiber, and fuel and sustainable/responsible use of natural resources.
Sector_Skills-07	Utilize leadership and interpersonal skills in team work and group settings.

Focus Area Level Knowledge and Skills

These Knowledge and Skill Statements for the four Focus Area Programs of Study in the Agriculture Career Cluster.

Agribusiness Systems Focus Area Knowledge and Skill Statements

AG-BIZ 1	Apply management planning principles in AFNR business enterprises.
AG-BIZ 2	Use record keeping to accomplish AFNR business objectives, manage budgets, and comply with laws and regulations.
AG-BIZ 3	Manage cash budgets, credit budgets, and credit for an AFNR business using generally accepted accounting principles.
AG-BIZ 4	Develop a business plan for an AFNR enterprise or business unit.
AG-BIZ 5	Use sales and marketing principles common to agribusiness systems to accomplish AFNR business objectives.

Animal Systems Focus Area - Knowledge and Skill Statements

AG-ANI 1	Analyze historic and current trends impacting the animal systems industry.
AG-ANI 2	Utilize best practice protocols for husbandry and welfare based upon animal behaviors.
AG-ANI 3	Design and provide proper animal nutrition given desired outcomes for performance, development, reproduction, and/or economic production.
AG-ANI 4	Apply principles of animal reproduction given desired outcomes for performance, development, and/or economic production.
AG-ANI 5	Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.
AG-ANI 6	Classify, evaluate and select animals based on anatomical and physiological characteristics.
AG-ANI 7	Apply principles of effective animal health care.

Food Products & Processing Systems Knowledge and Skill Statements

AG-FD 1	Develop and implement procedures to ensure safety, sanitation, and quality in food product and processing facilities.
AG-FD 2	Apply principles of nutrition, biology, microbiology, chemistry, and human behavior to development of food products.
AG-FD 3	Select and process food products for storage, distribution, and consumption.
AG-FD 4	Explain the scope of the food industry and the historical and current developments of food products and processing.

Plant Systems Knowledge and Skill Statements

AG-PL 1	Develop and implement a crop management plan for a given production goal that accounts for environmental factors.
AG-PL 2	Apply the principles of classification, plant anatomy, and plant physiology to plant production and management.
AG-PL 3	Propagate, culture, and harvest plants and plant products based on current industry standards.
AG-PL 4	Apply principles of design in plant systems to enhance an environment (e.g., floral, forest, landscape, and farm).

Power, Structural & Technology Systems Knowledge and Skill Statements

AG-PST 1	Apply physical science principles and engineering applications related to mechanical equipment, structures, and biological systems to solve problems and improve performance in AFNR power, structural, and technical systems.
AG-PST 2	Operate and maintain mechanical equipment related to AFNR power, structural, and technical systems.
AG-PST 4	Plan, build, and maintain AFNR structures.
AG-PST 3	Service and repair mechanical equipment and power systems used in AFNR power, structural, and technical systems.
AG-PST 5	Use control, monitoring, geospatial, and other technologies in AFNR power, structural, and technical systems.

Employability Knowledge and Skill Statements with Suggested Performance Indicators

EMP-01	Adhere to workplace practices	Foundational
Suggested Performance Indicators	(A) Explain and follow workplace standards, rules, and regulations (B) Show up on time and prepared to work (C) Demonstrate the ability to take direction, be proactive, and work independently	✓ ✓ ✓
EMP-02	Exhibit personal responsibility and accountability	Foundational
Suggested Performance Indicators	(A) Apply professional and ethical standards of the industry to personal conduct (B) Maintain integrity and promote personal and professional integrity in co-workers (C) Take responsibility and carry out work assignments	✓ ✓ ✓
EMP-03	Practice cultural competence	Foundational
Suggested Performance Indicators	(A) Demonstrate awareness of issues related to diversity, equity, and inclusion (B) Work effectively with colleagues of differing abilities, cultures, and backgrounds (C) Describe issues relating to workplace harassment (D) Model behaviors that are respectful and sensitive of others	✓ ✓ ✓ ✓
EMP-04	Demonstrate teamwork and conflict resolution	Foundational
Suggested Performance Indicators	(A) Demonstrate the ability to collaborate and contribute to the work of a diverse team (B) Explain when it is appropriate to lead and when to follow another's lead (C) Demonstrate strategies for resolving issues with coworkers	✓ ✓ ✓
EMP-05	Communicate clearly and effectively	Foundational
Suggested Performance Indicators	(A) Listen attentively and speak and write clearly to convey information correctly (B) Interpret information and instructions presented in verbal and written form (C) Demonstrate effective communication with colleagues, supervisors, customers, and suppliers (D) Demonstrate the ability to communicate verbally, in writing, and using electronic communication tools	✓ ✓ ✓ ✓
EMP-06	Employ critical thinking to solve problems	Foundational
Suggested Performance Indicators	(A) Recognize problems in the workplace and diagnose their root causes (B) Develop well-reasoned plans to solve identified challenges (C) Apply and follow through on plans to ensure that problems are resolved	✓ ✓ ✓
EMP-07	Demonstrate creativity and innovative thinking	Foundational
Suggested Performance Indicators	(A) Develop ideas to solve problems in new and different ways (B) Investigate one's own and others' ideas to find those with greatest applicability (C) Develop and deploy plans to implement new ideas in the workplace	✓ ✓ ✓
EMP-08	Demonstrate fluency in workplace technologies	Foundational

Suggested Performance Indicators	(A) Demonstrate knowledge and application of general technology skills, including hardware and software commonly used in the industry (B) Use online communication, networking tools, and social networks to access, manage, evaluate, and create information to successfully function in a knowledge economy (C) Describe and demonstrate a fundamental understanding of the ethical, legal, and security issues surrounding access to and use of information technologies	✓ ✓ ✓
EMP-09	Plan, organize, and manage work	Foundational
Suggested Performance Indicators	(A) Identify an intended project outcome including available inputs, materials, labor, timeline for producing work, and job-site obligations (B) Effectively plan, monitor, and complete projects on time and within budget using available resources and materials (C) Demonstrate ability to write coherent reports and project summaries to communicate the progress of project work and its adherence to schedule	✓ ✓ ✓
EMP-10	Make informed career decisions	Foundational
Suggested Performance Indicators	(A) Identify job and entrepreneurial opportunities in the industry and the required education and credentials to obtain employment (B) Set short- and long-term career goals based on personal interests and aptitudes (C) Maintain a project portfolio (D) Develop a professional resume (E) Explain and demonstrate how to cultivate and maintain a professional presence in an online environment, including the appropriate use of social media and networking platforms	✓ ✓ ✓ ✓ ✓

**Agriculture, Food & Natural Resource Sector Skills Career Cluster Knowledge and Skill Statements
with Suggested Performance Indicators**

Sector_Skills-01	Analyze how issues, trends, technologies, and public policies impact systems in the Agriculture, Food & Natural Resources Career Clusters.	Foundational	Intermediate	Advanced
AG01.01.01	Explain how regulations and major laws impact management of AFNR activities.			
AG01.01.02	Describe the major impacts of AFNR legislation.			
AG01.01.03	Describe the major regulations impacting the management of an individual resource.			
AG01.01.04	Identify situations that violate regulations.			
AG01.02.01	Describe current issues impacting AFNR activities.			
AG01.02.02	Identify significant issues that impact work assignment.			
AG01.03.01	Identify, organize alternatives, and evaluate public policy issues related to AFNR.			
AG01.03.02	Identify alternatives to an issue's potential solution.			
AG01.03.03	Evaluate alternatives for strengths and weaknesses.			
AG01.03.04	Recommend a solution based on research and analysis.			
AG01.04.01	Consider public input in decision-making for AFNR activities.			
AG01.04.02	Conduct a local survey of public perceptions and desires concerning AFNR issues.			
AG01.05.01	Explain the impact of sustainability on ARNR activities and practices.			
AG01.05.02	Identify significant environmental and economic issues facing AFNR.			
AG01.05.03	List the potential economic, environmental, and social costs and benefits of enacting sustainability initiatives in AFNR.			
AG01.06.01	Recognize the historical, social, cultural and potential applications of biotechnology on AFNR activities.			
AG01.06.02	Discuss the current applications of biotechnology in AFNR.			
AG01.07.01	Demonstrate the application of biotechnology to AFNR activities.			
AG01.07.02	Explain how biotechnology is used in specific AFNR activities.			
Sector_Skills-02	Evaluate the nature and scope of the Agriculture, Food & Natural Resources Career Clusters and the role Agriculture, Food & Natural	Foundational	Intermediate	Advanced

	Resources play in society and the economy, both domestically and internationally.			
AG02.01.01	Examine company performance and goals within AFNR organizations and the AFNR industry.			
AG02.01.02	Examine the role and major functions of AFNR organizations to better utilize AFNR guidelines.			
AG02.01.03	Explain the major guidelines used by AFNR organizations to manage and improve performance while maintaining ecosystem health.			
AG02.01.04	Examine economic, social, and technological changes to spotlight their impact on AFNR organizations and the industry.			
AG02.01.05	Explain technological changes to reveal their impact on information technology and transportation.			
AG02.02.01	Examine the role of AFNR in global, national, and regional economies.			
AG02.02.02	State the economic output of AFNR-related industries in the United States.			
AG02.02.03	Describe the role of global supply and demand on AFNR.			
AG02.02.04	Evaluate the impact of AFNR activities in your local community.			
AG02.03.01	Explain the types of industries, organizations, and activities part of AFNR.			
AG02.03.02	Provide examples of AFNR organizations in each of the AFNR pathways.			
AG02.03.03	Explain the relationship between agriculture, food, and natural resources.			
AG02.03.04	Describe the role of government, multinational companies, regional companies, small businesses, entrepreneurs, and consumers in AFNR activities.			
AG02.04.01	Explain the influence of AFNR on society.			
AG02.04.02	Identify ways in which the average person interacts with AFNR on a daily basis.			
AG02.04.03	Find examples of tradition, custom, or policy that result from practices in AFNR.			
AG02.04.04	Communicate the importance of AFNR to general public.			
Sector_Skills-03	Examine and summarize importance of health, safety, and environmental management systems in AFNR organizations.	Foundational	Intermediate	Advanced

AG03.01.01	Examine health risks associated with a particular skill to better form personnel safety guidelines.			
AG03.01.02	Define what level of possible contamination or injury is considered a risk in order to set safety priorities.			
AG03.01.03	Assess mental and physical stresses to determine all aspects necessary to perform well and what health risks are associated with both the mental and physical aspects.			
AG03.02.01	Develop response plans to handle emergencies.			
AG03.02.02	Identify various emergency response plan requirements for a facility.			
AG03.02.03	Develop an emergency response plan for natural disasters.			
AG03.03.01	Identify hazards and acquire first aid skills to promote environmental safety.			
AG03.03.02	Identify general workplace safety hazards.			
AG03.03.03	Apply general workplace safety precautions/procedures.			
AG03.03.04	Acquire and maintain first aid certification.			
AG03.03.05	Acquire and maintain cardiopulmonary resuscitation (CPR) certification.			
AG03.03.06	Respond to medical emergencies.			
AG03.03.07	Explain purpose of pollution control systems.			
AG03.03.08	Describe procedures to comply with environmental regulations.			
AG03.03.09	Maintain environmental health and safety facilities.			
AG03.03.10	Handle chemicals and safety equipment appropriately.			
AG03.03.11	Explain ergonomic procedures.			
AG03.03.12	Assess workplace safety.			
AG03.03.13	Assess a safety-training plan.			
AG03.04.01	Examine required regulations to maintain/improve safety, health, and environmental management systems and sustainable business practices.			
AG03.04.02	Study appropriate resources to identify the major regulatory areas (e.g., personal protective equipment) and government laws and regulations.			
AG03.04.03	Examine the major system components to realize benefits of health, safety, and environmental management systems in AFNR organizations.			

AG03.04.04	Measure or estimate benefits to explain how government agencies promote compliance and improved health, safety, and environmental performance to AFNR organizations.			
AG03.04.05	Examine logistics, distribution, and transportation organizations to explain how AFNR organizations promote improved health, safety, and environmental performance.			
AG03.05.01	Enact procedures that demonstrate the importance of safety, health, and environmental responsibilities in the workplace.			
AG03.05.02	Establish a set of safety, health, and environmental principles to ensure a high level of performance.			
AG03.05.03	Develop a pollution/waste prevention plan to reduce or eliminate waste.			
AG03.06.01	Demonstrate methods to correct common hazards.			
AG03.06.02	Identify and describe common hazards in the workplace.			
AG03.06.03	Identify and describe major sources of information about hazards in the workplace (e.g., MSDS, work procedures, exposure control plans, training materials, labels, and signage).			
AG03.06.04	Identify sources of combustible/flammable materials, fire, and emergencies to establish a fire-safe environment.			
AG03.06.05	Interpret safety signs and symbols.			
AG03.07.01	Demonstrate application of personal and group health and safety practices.			
AG03.07.02	Identify procedures necessary for maintaining a safe work area.			
AG03.07.03	Identify methods to correct common hazards.			
AG03.07.04	Identify methods for disposing of hazardous materials.			
AG03.07.05	Demonstrate principals of safe physical movement to avoid slips, trips, and spills.			
AG03.07.06	Inspect and use protective equipment (PPE).			
Sector_Skills-04	Demonstrate stewardship of natural resources in AFNR activities.	Foundational	Intermediate	Advanced
AG04.01.01	Demonstrate evidence of interest and concern for natural resource stewardship.			
AG04.01.02	Explain how personal choices are related to natural resource sustainability.			

AG04.01.03	Describe strategies to help an organization create a culture of natural resource stewardship.			
AG04.02.01	Explain the environmental considerations of decision making in AFNR management.			
AG04.02.02	Predict the positive and negative impacts of given AFNR activities.			
Sector_Skills-05	Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources Career Pathways.	Foundational	Intermediate	Advanced
AG05.01.01	Locate and identify career opportunities that appeal to personal career goals.			
AG05.01.02	Locate and interpret career information for at least one career cluster.			
AG05.01.03	Identify job requirements for career pathways.			
AG05.01.04	Identify educational and credentialing requirements for career cluster and pathways.			
AG05.02.01	Match personal interest and aptitudes to selected careers.			
AG05.02.02	Identify personal interests and aptitudes.			
AG05.02.03	Identify job requirements and characteristics of selected careers.			
AG05.02.04	Compare personal interests and aptitudes with job requirements and characteristics of career selected.			
AG05.02.05	Modify career goals based on results of personal interests and aptitudes with career requirements and characteristics.			
AG05.03.01	Provide examples and descriptions of various careers in each of the AFNR pathways.			
AG05.03.02	List examples of careers that require various levels of postsecondary education in each AFNR pathway.			
AG05.03.03	Explain the primary benefit of having a career in each of the AFNR pathways.			
Sector_Skills-06	Analyze the interaction among AFNR systems in the production, processing and management of food, fiber, and fuel and sustainable/responsible use of natural resources.	Foundational	Intermediate	Advanced
AG06.01.01	Explain foundational cycles and systems of AFNR.			
AG06.01.02	Explain the typical plant and animal life cycle.			
AG06.01.03	Explain nutrient and water cycles.			

AG06.01.04	Describe basic plant and animal production cycles.			
AG06.02.01	Explain the interconnectedness of systems within AFNR.			
AG06.02.02	Describe how various systems (e.g., soil, water, economic, plant, insect, livestock production) are impacted by the production practices of a give crop such as corn or alfalfa.			
AG06.02.03	Explain how changes in one system in AFNR can benefit and cost components of other systems. (e.g., using less irrigation water and the impact on soli systems, economic systems, watersheds)			
Sector_Skills-07	Utilize leadership and interpersonal skills in team work and group settings.	Foundational	Intermediate	Advanced
AG07.01.01	Know and apply the essential elements of leadership and citizenship.			
AG07.01.02	Identify different models of leadership; recommend the best model for a project, program or systemic change.			
AG07.01.03	Identify the differences between systematic change and systemic change.			
AG07.01.04	Demonstrate knowledge of a local, state and national political processes which affect change management.			
AG07.02.01	Lead a team to accomplish an authentic community project.			
AG07.02.02	Demonstrate the use of facilitation and consensus building techniques in resolving issues.			
AG07.02.03	Identify legal and ethical issues relating to leading an authentic project.			
AG07.02.04	Analyze a topic, present both pros and cons in written format.			
AG07.02.05	Demonstrate the ability to speak in public in both extemporaneous and prepared situations using an AFNR related topic.			
AG07.03.01	Create a web page to present and interpret an AFNR related topic area or phenomenon.			
AG07.04.01	Adapt an interpretive program or site to accommodate people.			
AG07.04.02	Develop an operational plan for an interpretive center.			
AG07.04.03	Set up and staff a display booth during a community event.			
AG07.04.04	Develop a public use area to explain AFNR (display board, interpretive signs, brochures, ect, ect).			
AG07.05.01	Participate as a facilitator during a public meeting.			
AG07.06.01	Volunteer in an AFNR management area.			

Agriculture Career Cluster Knowledge and Skill Statements with Suggested Performance Indicators

AG-BIZ 1	Apply management planning principles in AFNR business enterprises.	Foundational	Intermediate	Advanced
AGBZ01.01.01	Develop a mission statement and related goals and objectives to guide business activities.			
AGBZ01.01.02	Identify planning approaches for preparing mission statement.			
AGBZ01.01.03	Write a mission statement.			
AGBZ01.01.04	Establish short- and long-term goals.			
AGBZ01.01.05	Ask for feedback from stakeholders to test the impact of the mission statement.			
AGBZ01.01.06	Disseminate mission statement to inform fellow employees and gain in-house support.			
AGBZ01.02.01	Apply management skills to organize an AFNR enterprise or business unit.			
AGBZ01.02.02	Identify management types.			
AGBZ01.02.03	Identify organizational structures.			
AGBZ01.02.04	Identify time management techniques.			
AGBZ01.02.05	Make business agreements.			
AGBZ01.02.06	Follow local, state, and federal regulations and appreciate the consequences of not following them.			
AGBZ01.02.07	Recruit, train, and evaluate human resources.			
AGBZ01.02.08	Make business presentations.			
AG-BIZ 2	Use record keeping to accomplish AFNR business objectives, manage budgets, and comply with laws and regulations.	Foundational	Intermediate	Advanced
AGBZ02.01.01	Employ fundamental accounting principles in business bookkeeping and associated financial files.			
AGBZ02.01.02	Budget resources (e.g., capital, human, financial, time).			
AGBZ02.01.03	Manage assets for optimum utilization.			
AGBZ02.01.04	Manage risk of liabilities.			
AGBZ02.01.05	Evaluate credit uses and options.			
AGBZ02.01.06	Prepare and interpret financial statements (e.g., balance sheet, profit/loss statement, cash flow statement).			

AGBZ02.01.07	Prepare tax forms (e.g., W-4, I9, Depreciation, 1099, Workers Compensation).			
AGBZ02.01.08	Determine cost of doing business.			
AGBZ02.01.09	Compare and examine advantages and disadvantages of banking procedures (e.g., bank reconciliation).			
AGBZ02.01.10	Analyze investment options (e.g., buy, lease, finance, risk).			
AGBZ02.02.01	Prepare and maintain all files as needed for effective record keeping practices.			
AGBZ02.02.02	Identify information management systems.			
AGBZ02.02.03	Develop record keeping techniques and practices.			
AGBZ02.02.04	Keep production and agribusiness records.			
AGBZ02.02.05	Make records analysis.			
AG-BIZ 3	Manage cash budgets, credit budgets, and credit for an AFNR business using generally accepted accounting principles.	Foundational	Intermediate	Advanced
AGBZ03.01.01	Employ fundamental accounting principles in business bookkeeping and associated financial files.			
AGBZ03.01.02	Budget resources (e.g., capital, human, financial, time).			
AGBZ03.01.03	Manage assets for optimum utilization.			
AGBZ03.01.04	Manage risk of liabilities.			
AGBZ03.01.05	Evaluate credit uses and options.			
AGBZ03.01.06	Prepare and interpret financial statements (e.g., balance sheet, profit/loss statement, cash flow statement).			
AGBZ03.01.07	Prepare tax forms (e.g., W-4, I9, Depreciation, 1099, Workers Compensation).			
AGBZ03.01.08	Determine cost of doing business.			
AGBZ03.01.09	Compare and examine advantages and disadvantages of banking procedures (e.g., bank reconciliation).			
AGBZ03.01.10	Analyze investment options (e.g., buy, lease, finance, risk).			
AG-BIZ 4	Develop a business plan for an AFNR enterprise or business unit.	Foundational	Intermediate	Advanced
AGBZ04.01.01	Identify strategies to manage or mitigate risk.			
AGBZ04.01.02	Identify sources of risk for an AFNR operation.			

AGBZ04.01.03	Explain risk management strategies common across all industries and strategies specific to AFNR operations.			
AGBZ04.01.04	Match appropriate risk management strategies to risk situations in an AFNR operation.			
AGBZ04.02.01	Develop business goals and strategies that capitalize on opportunities in an AFNR market.			
AGBZ04.02.02	Evaluate market opportunities.			
AGBZ04.02.03	Establish mission and vision for AFNR enterprise or business unit.			
AGBZ04.02.04	Write business goals that are clear, specific, realistic, and aligned to the mission and vision of the organization.			
AGBZ04.02.05	Define the purpose, customers, and goals of the business.			
AGBZ04.02.06	Prepare a one-year and multiple-year projected budget for the business.			
AGBZ04.03.01	Develop an operation and/or production plan to provide required levels of product or service.			
AGBZ04.03.02	Identify the resources required for operation or production of an AFNR enterprise or business unit.			
AGBZ04.03.03	Calculate costs of carrying inventory.			
AGBZ04.03.04	List the components of a supply chain in an AFNR enterprise or business unit.			
AGBZ04.04.01	Analyze the strengths, weaknesses, opportunities, and threats to an AFNR enterprise or business unit.			
AGBZ04.04.02	Collect feedback from shareholders, stakeholders, and outside sources.			
AGBZ04.04.03	Describe the opportunities and threats unique to AFNR operations.			
AGBZ04.04.04	Analyze strengths and weakness of an AFNR enterprise or business unit compared to peer organizations.			
AG-BIZ 5	Use sales and marketing principles common to agribusiness systems to accomplish AFNR business objectives.	Foundational	Intermediate	Advanced
AGBZ05.01.01	Conduct market research.			
AGBZ05.01.02	Evaluate methods of marketing products and services.			
AGBZ05.01.03	Apply economic principles to marketing (e.g., supply and demand).			
AGBZ05.01.04	Research products and service design(s).			
AGBZ05.02.01	Develop a marketing plan.			

AGBZ05.02.02	Identify and develop value-added products.			
AGBZ05.02.03	Develop public relations campaigns.			
AGBZ05.02.04	Develop sales goals and incentive programs.			
AGBZ05.03.01	Implement a marketing plan.			
AGBZ05.03.02	Promote products and services.			
AGBZ05.03.03	Advertise products and services.			
AGBZ05.04.01	Merchandise products and services.			
AGBZ05.04.02	Promote products and services.			
AGBZ05.04.03	Advertise products and services.			
AGBZ05.05.01	Use selling strategies and practices to sell AFNR products and/or services.			
AGBZ05.05.02	Prepare for a sales call.			
AGBZ05.05.03	Establish realistic and specific outcomes for a sales call.			
AGBZ05.05.04	Engage appropriately with a customer in a sales call.			
AGBZ05.05.05	Listen and respond to customer needs and objections on a sales call.			

Animal Systems Knowledge and Skill Statements with Suggested Performance Indicators

AG-ANI 1	Analyze historic and current trends impacting the animal systems industry.	Foundational	Intermediate	Advanced
AGAN01.01.01	1. Explain the variety and scope of managed animal systems in the United States and around the world including: livestock, poultry, aquaculture, companion animals, zoo animals, and exotic animals.			
AGAN01.01.02	List the major livestock produced in each region of the world.			
AGAN01.01.03	*Describe the scope and economic impact of the companion animal industry.			
AGAN01.02.01	Explain the historical development of animal systems around the world.			
AGAN01.02.02	Identify the origin of major livestock, poultry and companion animal species and breeds.			
AGAN01.02.03	Describe major changes in animal systems over the past 100 years. (e.g., greater confinement of livestock and poultry)			
AGAN01.02.04	Explain how characteristics of animals developed over time in response to animals' environments and selection efforts of humans.			
AGAN01.03.01	Describe trends in the animal systems industry.			
AGAN01.03.02	Explain how animal systems are influenced by a country's economic growth and development.			
AGAN01.03.03	Describe emerging careers related to animal systems.			
AGAN01.03.04	Identify impacts of technology on animal systems.			
AGAN01.04.01	Recognize the historical, social, cultural and potential applications of biotechnology in the animal systems industry.			
AGAN01.04.02	Provide examples of how biotechnology has been used to solve an issue in the animal systems industry.			
AG-ANI 2	Utilize best practice protocols for husbandry and welfare based upon animal behaviors.	Foundational	Intermediate	Advanced
AGAN02.01.01	Develop a safety plan for working with a specific animal.			
AGAN02.01.02	Explain factors that serve to stimulate or discourage given types of animal behavior.			
AGAN02.01.03	Recognize the normality curve of animal behavior.			
AGAN02.01.04	Perform safe handling procedures when working with animals.			

AGAN02.01.05	Identify strengths and weaknesses of an animal safety handling plan.			
AGAN02.01.06	Operate animal facilities to insure safety of animals.			
AG-ANI 3	Design and provide proper animal nutrition given desired outcomes for performance, development, reproduction, and/or economic production.	Foundational	Intermediate	Advanced
AGAN03.01.01	Examine animal developmental stages.			
AGAN03.01.02	Recognize the different phases of an animal's life cycle.			
AGAN03.01.03	Select diets which provide the appropriate quantity of nutrients for each animal developmental stage.			
AGAN03.01.04	Explain why nutrient requirements are different throughout an animal's life cycle.			
AGAN03.02.01	Assess whether the nutritional requirements of a given animal are being met by recording performance and comparing feed variations.			
AGAN03.02.02	Use different types of feedstuffs (e.g., roughage, concentrates) to create a feed ration containing the appropriate amounts of required nutrients.			
AGAN03.02.03	Use different forms of feedstuffs (e.g., pellets, cracked, rolled, ground) to create a diet that meets the needs of a specific animal.			
AGAN03.03.01	Design a nutritional plan for a given animal with a clearly stated outcome.			
AGAN03.03.02	Calculate nutrient requirements.			
AGAN03.03.03	Analyze nutritional value of feedstuffs.			
AGAN03.03.04	Evaluate proposed plan for effectiveness and economical feasibility.			
AGAN03.03.05	Create a balanced ration for a given animal.			
AG-ANI 4	Apply principles of animal reproduction given desired outcomes for performance, development, and/or economic production.	Foundational	Intermediate	Advanced
AGAN04.01.01	Evaluate animals for breeding readiness and soundness.			
AGAN04.01.02	Summarize factors that contribute to reproductive maturity.			
AGAN04.01.03	Identify reproductive challenges that can arise from the anatomy or physiology of the male or female reproductive system.			
AGAN04.02.01	Apply scientific techniques in breeding of animals.			
AGAN04.02.02	Design a breeding systems based on understanding of genetics.			
AGAN04.02.03	Explain the processes of natural and artificial breeding methods.			
AGAN04.02.04	Explain the use of quantitative breeding values (e.g., EPDs) in the selection of animals for breeding.			

AGAN04.02.05	Explain the use of reproductive management practices including estrous synchronization, embryo transfer, and superovulation.			
AGAN04.03.01	Evaluate the male and female reproductive systems in a given animal species.			
AGAN04.03.02	Identify the parts of male and female reproductive tracts on example animals.			
AGAN04.03.03	Analyze the reproductive cycle of a given animal.			
AGAN04.03.04	Explain the function of components in the male and female reproductive systems.			
AGAN04.04.01	Demonstrate the application of biotechnology to AFNR activities.			
AGAN04.04.02	Discuss the role of biotechnology in animal reproduction.			
AG-ANI 5	Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.	Foundational	Intermediate	Advanced
AGAN05.01.01	Reduce or mitigate the environmental impacts of animal management or production.			
AGAN05.01.02	Identify impacts on the environment of a given animal management or production situation.			
AGAN05.01.03	List strategies to reduce or mitigate environmental impacts.			
AGAN05.01.04	Apply techniques to prevent potentially negative environmental impacts in an animal management or production situation.			
AGAN05.02.01	Describe the effects of environmental conditions on animals.			
AGAN05.02.02	Describe optimal environmental conditions for a given animal.			
AGAN05.02.03	Use equipment and facilities that contribute to optimal environmental conditions.			
AG-ANI 6	Classify, evaluate and select animals based on anatomical and physiological characteristics.	Foundational	Intermediate	Advanced
AGAN06.01.01	Classify animals by hierarchical taxonomy and use.			
AGAN06.01.02	Describe use of biological rank-based classification for animals.			
AGAN06.01.03	List the classification of common livestock, poultry and companion animals.			
AGAN06.01.04	Explain ways animals can be classified by use (e.g., agricultural use			
AGAN06.01.05	Explain how breeds are use to classify animals of the same species.			

AGAN06.02.01	Describe basic functions of animal cells, organs and systems.			
AGAN06.02.02	Diagram a typical animal cell.			
AGAN06.02.03	Describe the properties, locations and functions of types of animal tissue and organs.			
AGAN06.02.04	Identify major animal systems and describe function.			
AGAN06.03.01	Explain how the components and systems of animal anatomy and physiology relate to the production and use of animals.			
AGAN06.03.02	Describe how skeletal and muscular systems relate to the production of meat and/or milk in livestock animals.			
AGAN06.03.03	Describe how skeletal system structure and movement impacts use of horses.			
AGAN06.04.01	Select animals for specific purposes and maximum performance based on anatomy and physiology.			
AGAN06.04.02	Identify anatomical or physiological disorders common in companion animals.			
AGAN06.04.03	Select animals to maximize performance based on anatomical and physiological characteristics that affect growth and reproduction.			
AGAN06.04.04	Evaluate an animal against its optimal anatomical and physiological characteristics.			
AG-ANI 7	Apply principles of effective animal health care.	Foundational	Intermediate	Advanced
AGAN07.01.01	Implement a prevention and treatment program for animal diseases, parasites and other disorders for a given animal.			
AGAN07.01.02	Perform health-check evaluations on animals.			
AGAN07.01.03	Treat common diseases, parasites and physiological disorders of animals.			
AGAN07.01.04	Design an animal health prevention and treatment program.			
AGAN07.02.01	Perform surgical and nonsurgical veterinary treatments and procedures.			
AGAN07.02.02	Explain the clinical significance of common considerations of veterinary treatments,			
AGAN07.02.03	Prepare animals, facilities and equipment for surgical and nonsurgical veterinary treatments and procedures.			

Food Products & Processing Knowledge and Skill Statements with Suggested Performance Indicators

AG-FD 1	Develop and implement procedures to ensure safety, sanitation, and quality in food product and processing facilities.	Foundational	Intermediate	Advanced
AGFD01.01.01	Implement Hazard Analysis and Critical Control Point (HACCP) procedures.			
AGFD01.01.02	Describe the principles of HACCP.			
AGFD01.01.03	Outline procedures to eliminate possible contamination hazards associated with food products and processing.			
AGFD01.02.01	Develop operational procedures and maintenance plans for food processing equipment and facilities.			
AGFD01.02.02	Develop and maintain a Standard Sanitation Operating Procedure (SSOP).			
AGFD01.02.03	Explain and demonstrate Good Manufacturing Practices (GMP).			
AGFD01.02.04	Perform equipment and facility maintenance in a food product and processing operation.			
AGFD01.02.05	Practice worker safety procedures.			
AGFD01.03.01	Employ safety and sanitation procedures for the handling, processing, and storage of food products.			
AGFD01.03.02	Explain techniques and procedures for safe handling of food products.			
AGFD01.03.03	Perform quality-assurance tests on food products.			
AGFD01.03.04	Demonstrate approved food product handling techniques.			
AGFD01.03.05	Explain the importance of microbiological tests in food product preparation.			
AGFD01.01.01	Implement Hazard Analysis and Critical Control Point (HACCP) procedures.			
AGFD01.01.02	Describe the principles of HACCP.			
AGFD01.01.03	Outline procedures to eliminate possible contamination hazards associated with food products and processing.			
AGFD01.02.01	Develop operational procedures and maintenance plans for food processing equipment and facilities.			
AGFD01.02.02	Develop and maintain a Standard Sanitation Operating Procedure (SSOP).			
AGFD01.02.03	Explain and demonstrate Good Manufacturing Practices (GMP).			
AGFD01.02.04	Perform equipment and facility maintenance in a food product and processing operation.			
AGFD01.02.05	Practice worker safety procedures.			

AGFD01.03.01	Employ safety and sanitation procedures for the handling, processing, and storage of food products.			
AGFD01.03.02	Explain techniques and procedures for safe handling of food products.			
AGFD01.03.03	Perform quality-assurance tests on food products.			
AGFD01.03.04	Demonstrate approved food product handling techniques.			
AGFD01.03.05	Explain the importance of microbiological tests in food product preparation.			
AG-FD 2	Apply principles of nutrition, biology, microbiology, chemistry, and human behavior to development of food products.	Foundational	Intermediate	Advanced
AGFD02.01.01	Execute key processes related to food product development and enhancement.			
AGFD02.01.02	Conduct research.			
AGFD02.01.03	Apply the use of chemistry.			
AGFD02.01.04	Comply with and apply USDA/FDA standards.			
AGFD02.01.05	Use product development (e.g., consumer opinion, taste testing).			
AGFD02.01.06	Conduct nutritional analysis (e.g., biochemistry).			
AGFD02.01.07	Compare and contrast the nutritive value of food groups.			
AGFD02.02.01	Field-test a food product for consumer acceptance.			
AGFD02.02.02	Describe human behaviors related to food.			
AGFD02.02.03	Plan a field test for a new food product.			
AGFD02.02.04	Perform sensory testing of a new food product with consumers.			
AGFD02.03.01	Analyze a food product to identify food constituents.			
AGFD02.03.02	Compare the nutritive value of food.			
AGFD02.03.03	Describe common food constituents (e.g., fats, vitamins, proteins)			
AGFD02.03.04	Explain how food constituents (proteins, minerals, etc.) contribute to product taste and appearance.			
AGFD02.04.01	Determine the physical and chemical properties of a food product.			
AGFD02.04.02	Identify the required information for a food label.			
AGFD02.04.03	Explain the function of common food additives.			
AGFD02.04.04	Predict the effects of altering a food product's formulation.			
AG-FD 3	Select and process food products for storage, distribution, and consumption.	Foundational	Intermediate	Advanced

AGFD03.01.01	Evaluate and grade food products.			
AGFD03.01.02	Evaluate, grade, and classify meat, egg, fish, poultry, and dairy products.			
AGFD03.01.03	Evaluate, grade, and classify processed fruit and vegetable products.			
AGFD03.01.04	Evaluate, grade, and classify grain, legume, and oilseed products.			
AGFD03.02.01	Process food products for sale and distribution.			
AGFD03.02.02	Formulate food packages based on standard weights and measures.			
AGFD03.02.03	Prepare fresh food products for distribution and sale.			
AGFD03.02.04	Preserve foods through a variety of techniques.			
AGFD03.02.05	Select packaging for storage of processed foods.			
AGFD03.02.06	Evaluate storage conditions for food quality, shelf life, and indented use.			
AGFD03.03.01	Use harvesting, selection, and selection techniques to obtain quality food products for processing and distribution.			
AGFD03.03.02	Assign quality grades and yield grades to food products according to industry standards.			
AGFD03.03.03	Perform quality-assurance inspections of raw food products.			
AGFD03.03.04	Describe acceptable animal treatment and harvesting techniques.			
AGFD03.01.01	Evaluate and grade food products.			
AGFD03.01.02	Evaluate, grade, and classify meat, egg, fish, poultry, and dairy products.			
AGFD03.01.03	Evaluate, grade, and classify processed fruit and vegetable products.			
AGFD03.01.04	Evaluate, grade, and classify grain, legume, and oilseed products.			
AGFD03.02.01	Process food products for sale and distribution.			
AGFD03.02.02	Formulate food packages based on standard weights and measures.			
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AGFD03.03.02	Assign quality grades and yield grades to food products according to industry standards.			
AGFD03.03.03	Perform quality-assurance inspections of raw food products.			
AGFD03.03.04	Describe acceptable animal treatment and harvesting techniques.			

AG-FD 4	Explain the scope of the food industry and the historical and current developments of food products and processing.	Foundational	Intermediate	Advanced
AGFD04.01.01	Explain the participants and their relationships in the food industry.			
AGFD04.01.02	Describe the role of producers, wholesale buyers, ingredient manufacturers, merchandisers, processors, distributors, and retailers in the food industry.			
AGFD04.01.03	Explain the relationships among participants in the food industry for a given food product.			
AGFD04.02.01	Describe historical developments in food products and processing.			
AGFD04.02.02	Describe technological advancements that impacted food processing, storage, and distribution.			
AGFD04.02.03	Explain how environmental and GMO concerns about food products have impacted the food industry.			
AGFD04.02.04	Discuss food safety issues raised by consumers over time and the resulting impact on the food industry.			
AGFD04.02.05	Predict trends and their impact on the future of food production and processing.			
AGFD04.03.01	Explain the role of industry associations, governmental agencies, and other organizations in the food industry.			
AGFD04.03.02	Discuss the application of industry standards in food products and processing.			
AGFD04.03.03	Explain the importance of industry standard grading systems for food products and processing.			
AGFD04.03.04	Identify examples of collaboration between industry associations, governmental agencies, and other organizations related to a food industry issue.			
AGFD04.04.01	Recognize the historical, social, cultural and potential applications of biotechnology on food products and processing.			
AGFD04.04.02	Explain the costs and benefits of biotechnology applications in food products and processing.			

Plant Systems Knowledge and Skill Statements with Suggested Performance Indicators

AG-PL 1	Develop and implement a crop management plan for a given production goal that accounts for environmental factors.	Foundational	Intermediate	Advanced
AGPL01.01.01	Develop a fertilization plan using the results of an analysis and evaluation of nutritional requirements and environmental conditions.			
AGPL01.01.02	Describe nutrient sources.			
AGPL01.01.03	Determine plant nutrient requirements for optimum growth.			
AGPL01.01.04	Identify function of plant nutrients in plants.			
AGPL01.01.05	Determine the environmental factors that influence and optimize plant growth.			
AGPL01.01.06	Apply nutrients to plants for economic growth.			
AGPL01.01.07	Describe nutrient application methods and appropriate practices.			
AGPL01.02.01	Evaluate soil/media nutrients using tests of appropriate materials and/or by examining data.			
AGPL01.02.02	Collect and test soil/media and/or plant tissue.			
AGPL01.02.03	Interpret tests of soil/media and/or plant tissue.			
AGPL01.02.04	Identify soil slope, structure, and type.			
AGPL01.02.05	Evaluate soil/media permeability and water-holding capacity.			
AGPL01.02.06	Determine the chemical properties of soil/media.			
AGPL01.02.07	Determine land use capability.			
AGPL01.02.08	Determine the biological functions of microorganisms of soil/media.			
AGPL01.03.01	Determine the influence of environmental factors on plants.			
AGPL01.03.02	Describe plant response to light color, intensity, and duration.			
AGPL01.03.03	Determine the optimal and allowable air and soil temperature and water conditions for plant growth.			
AGPL01.03.04	Describe the optimal and allowable characteristics of the growing media for plant growth.			
AGPL01.04.01	Manage water conditions for plant growth.			
AGPL01.04.02	Explain how soil draining and water-holding capacity can be improved.			
AGPL01.04.03	Design an irrigation schedule that makes the most efficient use of irrigation water.			
AGPL01.04.04	Identify categories of soil water.			

AGPL01.05.01	Manage characteristics of growing media.			
AGPL01.05.02	Explain the various types and components of growing media.			
AGPL01.05.03	Describe techniques to reduce soil compaction.			
AGPL01.05.04	Modify composition of growing media to better meet plant growth needs.			
AG-PL 2	Apply the principles of classification, plant anatomy, and plant physiology to plant production and management.	Foundational	Intermediate	Advanced
AGPL02.01.01	Examine unique plant properties to identify/describe functional differences in plant structures including roots, stems, flowers, leaves, and fruit.			
AGPL02.01.02	Identify plant structures (e.g., seeds).			
AGPL02.01.03	Describe physiological functions of plants.			
AGPL02.01.04	Describe germination process and conditions.			
AGPL02.02.01	Classify plants based on physiology for taxonomic or other classifications.			
AGPL02.02.02	Classify plants as monocots or dicots.			
AGPL02.02.03	Classify plants as annuals, biennials, or perennials.			
AGPL02.02.04	Classify plants according to growth habit.			
AGPL02.02.05	Classify plants by type.			
AGPL02.02.06	Classify plants by economic value.			
AGPL02.02.07	Classify plants by agricultural use.			
AGPL02.02.08	List the scientific names and key characteristics of agriculturally important plants.			
AGPL02.03.01	Apply knowledge of plant anatomy and plant structures to plant systems activities.			
AGPL02.03.02	Identify root types, tissues, and components.			
AGPL02.03.03	Explain active and passive transport through root systems.			
AGPL02.03.04	Identify the components of plant stems.			
AGPL02.03.05	Explain translocation.			
AGPL02.03.06	Explain how plant management techniques can impact mineral transport and translocation.			
AGPL02.03.07	Identify the different types of flowers and flower forms.			
AGPL02.03.08	Explain how flower structures impact plant breeding and production.			
AGPL02.03.09	Describe the types and components of seeds and fruits.			

AGPL02.03.10	Explain how plants are managed for the production of seeds and fruit.			
AGPL02.04.01	Apply knowledge of plant physiology and energy conservation to plant systems activities.			
AGPL02.04.02	Explain how plant management relies on understanding of light-dependent and light-independent reactions of photosynthesis.			
AGPL02.04.03	Relate plant growth, management, and harvesting strategies in response to stages of cellular respiration in plants.			
AGPL02.04.04	Use plant growth regulators to product desired responses from plants.			
AG-PL 3	Propagate, culture, and harvest plants and plant products based on current industry standards.	Foundational	Intermediate	Advanced
AGPL03.01.01	Develop a production plan that applies the fundamentals of plant management.			
AGPL03.01.02	Identify and select seeds and plants.			
AGPL03.01.03	Manipulate and evaluate environmental conditions (e.g., irrigation, mulch, shading) to foster plant germination, growth and development.			
AGPL03.01.04	Evaluate and demonstrate planting practices (e.g., population rate, germination/seed vigor, inoculation, seed and plant treatments).			
AGPL03.01.05	Evaluate and demonstrate transplanting practices.			
AGPL03.01.06	Prepare soil/media for planting.			
AGPL03.01.07	Control plant growth (e.g., pruning, pinching, disbudding, topping, detasseling, staking, cabling, shearing, shaping).			
AGPL03.01.08	Prepare plants and plant products for distribution.			
AGPL03.02.01	Harvest crops using methods that apply fundamentals of plant management.			
AGPL03.02.02	Determine crop maturity.			
AGPL03.02.03	Identify harvesting practices and equipment.			
AGPL03.02.04	Demonstrate common harvesting techniques.			
AGPL03.02.05	Calculate yield and loss.			
AGPL03.02.06	Identify options for crop storage.			
AGPL03.02.07	Maintain quality of plant products in storage.			
AGPL03.02.08	Prepare plants and plant products for distribution.			

AGPL03.03.01	Handle crops using methods that apply fundamentals of plant management.			
AGPL03.03.02	Demonstrate techniques for grading, handling, and packaging plants and plant products for distribution.			
AGPL03.03.03	Predict typical loss of plants or plant products in the process of handling, packaging and/or distribution.			
AGPL03.04.01	Store crops using methods that apply fundamentals of plant management.			
AGPL03.04.02	Identify methods for storing plants and plant products.			
AGPL03.04.03	Explain how cellular respiration affects plant and plant product storage.			
AGPL03.04.04	Explain the proper conditions for storage of plants and plant products.			
AGPL03.05.01	Produce crops using a plant management plan.			
AGPL03.05.02	Inspect propagation material for pests and diseases.			
AGPL03.05.03	Prepare growing media/soil for planting.			
AGPL03.05.04	Prepare a schedule for production that accommodates environmental setting (natural, greenhouse, or modified).			
AGPL03.05.05	Demonstrate proper plant procedures and post-planting care.			
AGPL03.05.06	Control growth through mechanical, cultural, or mechanical means.			
AGPL03.06.01	Develop and implement an integrated pest management plan.			
AGPL03.06.02	Identify major weeds, beneficial insects, insect pests, and plant diseases for region and crop.			
AGPL03.06.03	Diagram the life cycles of major plant pests and diseases.			
AGPL03.06.04	Explain the proper selection and use of pesticide controls and formulations.			
AGPL03.06.05	Compare the risks and benefits of chemical and non-chemical pest controls.			
AGPL03.07.01	Demonstrate plant propagation techniques.			
AGPL03.07.02	Explain pollination, cross-pollination, and self-pollination of flowering plants.			
AGPL03.07.03	Design plans to control the pollination of flowering plants.			
AGPL03.07.04	Demonstrate seed-sowing techniques that result in favorable germination, viability, and vigor.			
AGPL03.07.05	Demonstrate proper procedures in budding or grafting plant materials.			

AGPL03.07.06	Propagate plants by micropropagation.			
AGPL03.07.07	Explain the principles and processes of recombinant DNA technology in plants.			
AGPL03.07.08	Compare plant breeding and genetic modification.			
AGPL03.08.01	Apply principles and practices of sustainable agriculture to plant production.			
AGPL03.08.02	Calculate the economic, environmental, and human health costs and benefits of incorporating sustainable plant production practices.			
AGPL03.08.03	Plan the production of plants or plant products that incorporate sustainable practices.			
AGPL03.08.04	Identify the certifying options for crops and plants produced using sustainable techniques.			
AGPL03.09.01	Demonstrate the application of biotechnology to plant production.			
AGPL03.09.02	Explain the principles and processes of recombinant DNA technology in plants.			
AGPL03.09.03	List the current applications of biotechnology in plant production.			
AG-PL 4	Apply principles of design in plant systems to enhance an environment (e.g., floral, forest, landscape, and farm).	Foundational	Intermediate	Advanced
AGPL04.01.01	Create a design using plants that demonstrates an application of basic design elements and principles.			
AGPL04.01.02	Conduct a site evaluation for physical condition and design implications.			
AGPL04.01.03	Apply elements of design (e.g., line, form, texture, color).			
AGPL04.01.04	Incorporate principles of design (e.g., space, scale, proportion, order).			
AGPL04.01.05	Use landscape design drawing tools including Computer-Aided Design (CAD) and industry-specific software.			
AGPL04.01.06	Select hard goods, supplies, and tools used in design.			
AGPL04.01.07	Select plant(s) for design.			

Power, Structural & Technology Systems Knowledge and Skill Statements with Suggested Performance Indicators

AG-PST 1	Apply physical science principles and engineering applications related to mechanical equipment, structures, and biological systems to solve problems and improve performance in AFNR power, structural, and technical systems.	Foundational	Intermediate	Advanced
AGPT01.01.01	Select energy sources for power generation.			
AGPT01.01.02	Identify petroleum sources (e.g., gasoline, diesel).			
AGPT01.01.03	Identify alternative sources (e.g., ethanol, biodiesel, air, wood, geothermal, solar).			
AGPT01.01.04	Compare environmental impact of energy sources.			
AGPT01.01.05	Compare efficiency of energy sources.			
AGPT01.01.06	Compare characteristics of energy sources.			
AGPT01.01.07	Discuss efficiency of systems (e.g., fuel cells, chemical, wind, hydro, nuclear, electric, mechanical, solar, biological).			
AGPT01.02.01	Use hand and power tools commonly required in power, structural, and technical systems			
AGPT01.02.02	Demonstrate use of measurement tools.			
AGPT01.02.03	Demonstrate use of hand tools and instruments used for service, construction, and fabrication.			
AGPT01.02.04	Demonstrate use of power tools and instruments used for service, construction, and fabrication.			
AGPT01.03.01	Investigate solutions to AFNR power, structural, and technical systems.			
AGPT01.03.02	Use the scientific method to guide investigation.			
AGPT01.03.03	Apply knowledge of physical science principles to identify the cause of the problem and to brainstorm solutions.			
AGPT01.03.04	Use engineering approach in the design and testing of potential solutions.			
AGPT01.04.01	Design or modify equipment, structures, or biological systems to improve performance of an AFNR enterprise or business unit.			
AGPT01.04.02	Generate ideas that will improve performance.			
AGPT01.04.03	Build rapid prototypes to test ideas and new designs.			
AGPT01.04.04	Evaluate success of prototypes.			

AGPT01.04.05	Determine feasibility of full-scale production of new design or modification.			
AGPT01.04.06	Plan production of design or modification.			
AG-PST 2	Operate and maintain mechanical equipment related to AFNR power, structural, and technical systems.	Foundational	Intermediate	Advanced
AGPT02.01.01	Maintain machinery and equipment by performing scheduled service routines.			
AGPT02.01.02	Lubricate machinery and equipment.			
AGPT02.01.03	Ensure presence and function of safety systems and hardware.			
AGPT02.01.04	Service electrical systems.			
AGPT02.01.05	Perform machine adjustments (e.g., belts, drive chains).			
AGPT02.01.06	Service filtration systems.			
AGPT02.01.07	Maintain fluid levels.			
AGPT02.01.08	Maintain vehicle, machinery, and equipment cleanliness and appearance.			
AGPT02.01.09	Maintain fluid conveyance components (e.g., hoses and lines, valves, nozzles).			
AGPT02.01.10	Design a preventive maintenance schedule.			
AGPT02.01.11	Identify causes of malfunctions and failures.			
AGPT02.01.12	Calibrate metering, monitoring, and sensing equipment.			
AGPT02.02.01	Perform service routines to maintain power units and equipment.			
AGPT02.02.02	Test and service electrical systems.			
AGPT02.02.03	Troubleshoot malfunctions and failures in equipment.			
AGPT02.02.04	Service filtration systems on power units.			
AGPT02.02.05	Perform equipment lubrication.			
AGPT02.02.06	Develop a preventive maintenance schedule.			
AGPT02.03.01	Operate machinery and equipment while observing all safety precautions.			
AGPT02.03.02	Describe function of machine controls and instrumentation.			
AGPT02.03.03	Perform appropriate start-up procedures.			
AGPT02.03.04	Select proper machine(s) for specific task(s).			
AGPT02.03.05	Safely operate equipment.			
AGPT02.03.06	Perform pre-operation inspection.			
AGPT02.03.07	List applicable laws for on- and off-highway operation.			

AG-PST 3	Service and repair mechanical equipment and power systems used in AFNR power, structural, and technical systems.	Foundational	Intermediate	Advanced
AGPT03.01.01	Service and repair the components of internal combustion engines using procedures for troubleshooting and evaluating performance.			
AGPT03.01.02	Describe principles of operation.			
AGPT03.01.03	Identify engine systems and components.			
AGPT03.01.04	Analyze and troubleshoot engines.			
AGPT03.01.05	Perform overhaul procedures.			
AGPT03.01.06	Evaluate engine performance through post-rebuild testing.			
AGPT03.02.01	Service and repair power transmission systems following manufacturer's guidelines.			
AGPT03.02.02	Describe features, benefits, and applications of various power transmission systems.			
AGPT03.02.03	Describe principles of operation of various power transmission systems.			
AGPT03.02.04	Perform calculations involving speed, torque, and power relationships.			
AGPT03.02.05	Describe features, benefits, and applications of mechanical transmission components (e.g., belts, chains, gears, bearings, seals, universals).			
AGPT03.02.06	Inspect, analyze, and repair hydrostatic transmissions.			
AGPT03.02.07	Inspect, analyze, and repair differentials and final drives.			
AGPT03.02.08	Inspect, analyze, and repair clutches and brakes.			
AGPT03.02.09	Inspect, analyze, and repair gear-type transmissions including power shift.			
AGPT03.02.10	Inspect, analyze, and repair auxiliary drives.			
AGPT03.03.01	Service and repair hydraulic systems by evaluating performance using maintenance manuals.			
AGPT03.03.02	Describe features, benefits, and applications of types of hydraulic systems.			
AGPT03.03.03	Describe physical principles of operation.			
AGPT03.03.04	Interpret symbols and schematic drawings.			
AGPT03.03.05	Describe the application and operation of major components.			
AGPT03.03.06	Inspect, analyze, and repair hydraulic components (e.g., pumps, valves).			
AGPT03.03.07	Inspect, analyze, and repair fluid conveyance components (e.g., hoses, lines).			
AGPT03.03.08	Evaluate system cleanliness.			

AGPT03.03.09	Identify hydraulic fittings and ports.			
AGPT03.04.01	Service and repair steering, suspension, traction, and vehicle performance systems by checking performance parameters.			
AGPT03.04.02	Evaluate traction, ballasting, and weight transfer.			
AGPT03.04.03	Evaluate vehicle stability.			
AGPT03.04.04	Determine optimum vehicle performance, e.g., horsepower management, fuel efficiency.			
AGPT03.04.05	Troubleshoot, adjust, and repair suspension systems.			
AGPT03.04.06	Inspect and repair steering systems.			
AGPT03.05.01	Execute the safe and proper use of construction/fabrication hand tools in the workplace.			
AGPT03.05.02	Demonstrate proper use of measurement and layout tools.			
AGPT03.05.03	Apply proper use of measurement and layout tools in construction/fabrication of an actual project.			
AGPT03.05.04	Demonstrate safe and proper techniques in using hand and power tools in construction/fabrication.			
AGPT03.05.05	Demonstrate hand and power tool usage to construct/fabricate an actual project according to blueprints or plans.			
AGPT03.05.06	Identify and demonstrate proper hand and power tool maintenance procedures.			
AGPT03.06.01	Service electrical systems by troubleshooting from schematics.			
AGPT03.06.02	Describe features and applications of electrical systems.			
AGPT03.06.03	Interpret symbols and wiring diagrams.			
AGPT03.06.04	Test and troubleshoot electrical systems and components (e.g., battery, charging, starting, lighting, instrumentation, accessories).			
AGPT03.06.05	Troubleshoot and install instrumentation and data acquisition system (e.g., Global Positioning System (GPS), spraying, planting, harvesting monitors).			
AGPT03.06.06	Diagnose and repair control systems and sensors (e.g., engine, transmission, implement).			
AGPT03.06.07	Describe features and applications of electrical systems.			
AGPT03.06.08	Interpret symbols and wiring diagrams.			

AGPT03.06.09	Test and troubleshoot electrical systems and components (e.g., battery, charging, starting, lighting, instrumentation, accessories).			
AGPT03.06.10	Troubleshoot and install instrumentation and data acquisition system (e.g., Global Positioning System (GPS), spraying, planting, harvesting monitors).			
AGPT03.06.11	Diagnose and repair control systems and sensors (e.g., engine, transmission, implement).			
AG-PST 4	Plan, build, and maintain AFNR structures.	Foundational	Intermediate	Advanced
AGPT04.01.01	Create sketches and plans of agricultural structures.			
AGPT04.01.02	Use current technology to develop simple plans and sketches.			
AGPT04.01.03	Identify symbols and drawing techniques used to develop simple plans and sketches.			
AGPT04.01.04	Use scale measurement and dimension to develop simple plans and sketches.			
AGPT04.02.01	Apply structural plans, specifications, and building codes.			
AGPT04.02.02	Identify components of an architectural drawing.			
AGPT04.02.03	Complete appropriate local permit applications.			
AGPT04.02.04	Follow applicable structural codes.			
AGPT04.03.01	Determine requirements and estimate costs for construction materials and procedures.			
AGPT04.03.02	Identify criteria for materials based on use or application of structure.			
AGPT04.03.03	Prepare request for construction bid.			
AGPT04.03.04	Prepare a project cost estimate.			
AGPT04.04.01	Follow architectural and mechanical plans to construct AFNR structures.			
AGPT04.04.02	Construct metal structures using welding fabrication processes.			
AGPT04.04.03	Install glass, ridged panels, and/or film plastics.			
AGPT04.04.04	Construct with concrete, brick, stone or masonry.			
AGPT04.04.05	Insulate a structure.			
AGPT04.04.06	Construct wood or metal building frames.			
AGPT04.04.07	Install pipes and plumbing equipment and fixtures.			
AGPT04.04.08	Install electrical wiring and fixtures.			
AGPT04.04.09	Paint or protect with coatings.			

AG-PST 5	Use control, monitoring, geospatial, and other technologies in AFNR power, structural, and technical systems.	Foundational	Intermediate	Advanced
AGPT05.01.01	Execute procedures and techniques for monitoring and controlling electrical systems using basic principles of electricity.			
AGPT05.01.02	Show proficiency in use of various meters.			
AGPT05.01.03	Discuss importance of and techniques for grounding.			
AGPT05.01.04	Show understanding of codes and regulations.			
AGPT05.01.05	Discuss various energy sources.			
AGPT05.02.01	Design control systems by referencing electrical drawings.			
AGPT05.02.02	Develop and read schematic drawings for a control system.			
AGPT05.02.03	Identify and describe uses of various components of control systems (i.e., transistors, relays, HVAC, logic controllers).			
AGPT05.02.04	Discuss the importance of maintenance schedules.			
AGPT05.03.01	Use geospatial technologies in AFNR applications.			
AGPT05.03.02	Describe principles of global positioning, Geographical Information Systems (GIS), and remote sensing.			
AGPT05.03.03	List examples of geospatial technology applications in AFNR.			
AGPT05.03.04	Install and test geospatial technologies in AFNR applications.			