



**PLANT & SOIL
AGRONOMICS SPECIALIST
SKILLS STANDARDS
OD46301**

Competency-Based Education: OKLAHOMA'S RECIPE FOR SUCCESS

BY THE INDUSTRY FOR THE INDUSTRY

Oklahoma's *CareerTech* system of competency-based education uses industry professionals and certification standards to identify the knowledge and abilities needed to master an occupation. This industry input provides the foundation for development of instructional materials that help prepare the comprehensively trained, highly skilled employees demanded by our workplace partners.

TOOLS FOR SUCCESS

CareerTech relies on three basic instructional components to deliver competency-based instruction: skills standards, curriculum materials, and competency assessments.

Skills standards provide the foundation for competency-based instruction in Oklahoma's *CareerTech* system. The skills standards outline the knowledge, skills, and abilities needed to perform related jobs within an industry. Skills standards are aligned with national skills standards; therefore, a student trained to the skills standards possesses technical skills that make him/her employable in both state and national job markets.

Curriculum materials contain information and activities that teach students the knowledge and skills outlined in the skills standards. In addition to complementing classroom instruction, curriculum resources provide supplemental activities to enhance learning and provide hands-on training experiences.

Competency Assessments test the student over material outlined in the skills standards and taught using the curriculum materials. When used with classroom performance evaluations, written competency assessments provide a means of measuring occupational readiness.

Although each of these components satisfy a unique purpose in competency-based education, they work together to reinforce the skills and abilities students need to gain employment and succeed on the job.

MEASURING SUCCESS

Written competency assessments are used to evaluate student performance. Results reports communicate competency assessment scores to students and provide a breakdown of assessment results by duty area. The results breakdown shows how well the student has mastered skills needed to perform major job functions and identifies areas of job responsibility that may require additional instruction and/or training.

Group analysis of student results also provides feedback to instructors seeking to improve the effectiveness of career and technology training. Performance patterns in individual duties indicate opportunities to evaluate training methods and customize instruction.

TRUE TO OUR PURPOSE

"Helping Oklahomans succeed in the workplace" defines the mission of Oklahoma *CareerTech* and its competency-based system of instruction. Skills standards, curriculum, and assessments that identify and reinforce industry expectations provide accountability for programs and assure *CareerTech*'s continued role in preparing skilled workers for a global job market

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Oklahoma Department of Career and Technology Education
Stillwater, Oklahoma

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**PLANT & SOIL SCIENCES
AGRONOMICS SPECIALIST
SKILLS STANDARDS
Frequency and Criticality Ratings**

- Duty A: Understand Basic Concepts of Plant Nutrition
- Duty B: Understand Basic Concepts of Soil Fertility
- Duty C: Demonstrate Knowledge of Soil Testing and Plant Analysis
- Duty D: Recognize Nutrient Sources and Applications
- Duty E: Understand Soil pH and Soil Amendments
- Duty F: Demonstrate Knowledge of Nutrient Management Planning
- Duty G: Understand Basic Soil Properties
- Duty H: Recognize Characteristics of Soil Erosion
- Duty I: Understand Restrictive Soil Layers
- Duty J: Utilize Skills Related to Site Characterization
- Duty K: Understand Processes Involving Water and Solute (Soil Solution) Movement
- Duty L: Understand Plant/Water Relations
- Duty M: Demonstrate Knowledge of Irrigation and Drainage
- Duty N: Understand Basic Concepts of Water Quality
- Duty O: Utilize Principles of Pest Management
- Duty P: Demonstrate Skills Related to Pest Sampling and Monitoring
- Duty Q: Develop Knowledge of Pest Identification
- Duty R: Utilize Skills Related to Decision Making Guidelines
- Duty S: Understand Basic Concepts of Non-Pesticide Management
- Duty T: Understand Basic Concepts of Pesticide Management
- DUTY U: Practice Environmental Stewardship
- DUTY V: Demonstrate Knowledge of Health and Safety Practices
- DUTY W: Recognize Cropping Systems
- DUTY X: Distinguish Between Hybrid and Variety
- DUTY Y: Understand Basic Concepts of Crop Establishment
- DUTY Z: Demonstrate Knowledge of Crop Growth, Development, and Diagnostics
- DUTY AA: Understand Concepts Related to Precision Agriculture
- DUTY BB: Recognize Procedures Related to Harvest and Storage
- DUTY CC: Understand Factors Related to Managing Production Risk

Frequency: represents how often the task is performed on the job. Frequency rating scales vary for different occupations. The rating scale used in this publication is presented below:

- 1 = less than once a week
- 2 = at least once a week
- 3 = once or more a day

Criticality: denotes the level of consequence associated with performing a task incorrectly. The rating scale used in this publication is presented below:

- 1 = slight
 - 2 = moderate
 - 3 = extreme
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DUTY A: Understand Basic Concepts of Plant Nutrition

CODE	TASK	F/C
A.01	List the 16 elements essential for plant nutrition	2/3
A.02	Classify the essential elements as primary, secondary, or micronutrient	2/3
A.03	Recognize the function of primary nutrients in plants	3/3
A.04	List chemical uptake forms of Nitrogen, Phosphorus, and Potassium	3/3
A.05	Specify how Nitrogen, Phosphorus and Potassium needs change according to plant growth stages	3/3

DUTY B: Understand Basic Concepts of Soil Fertility

CODE	TASK	F/C
B.01	Recognize and define nutrient sources in the soil <ul style="list-style-type: none"> • Soil solution • Cation exchange sites • Organic matter • Soil minerals 	2/3
B.02	Define nutrient transformations and interactions <ul style="list-style-type: none"> • Mineralization • Immobilization 	1/2
B.03	Describe how the processes of mass flow, diffusion, and root interception affect nutrient uptake	1/1
B.04	Describe the cation exchange process	1/2
B.05	Distinguish each primary and secondary nutrient as mobile or immobile in the soil	2/2
B.06	Describe how soil characteristics affect nutrient availability <ul style="list-style-type: none"> • Texture • Structure • Drainage/aeration • Soil moisture 	1/1
B.07	Recognize how different crops and cropping systems affect soil fertility and fertilization strategies	2/2

DUTY C: Demonstrate Knowledge of Soil Testing and Plant Analysis

CODE	TASK	F/C
C.01	Demonstrate how to take a soil sample for nutrient analysis	3/3
C.02	Recognize the relationship of soil test results to expect crop response	3/3

DUTY D: Recognize Nutrient Sources and Applications

CODE	TASK	F/C
D.01	Recognize plant nutrient sources <ul style="list-style-type: none"> • Organic matter • Irrigation water • Fertilizer application • Soil minerals • Animal waste • Urban/industrial waste 	3/3
D.02	Describe the physical form and analysis of nutrient sources <ul style="list-style-type: none"> • Anhydrous ammonia • Urea • Ammonium nitrate • Urea/ammonium nitrate solution • Ammonium sulfate 	3/2
D.03	Calculate fertilizer application rates from nutrient recommendation and fertilizer analysis information	3/3
D.04	Define application methods of fertilizer placement methods <ul style="list-style-type: none"> • Injection • Broadcast • Band • Fertigation • Foliar • Sidedress • Topdress 	3/2

DUTY E: Understand Soil pH and Soil Amendments

CODE	TASK	F/C
E.01	Define terms associated with soil pH <ul style="list-style-type: none"> • Soil pH • Buffer pH • Acidity • Alkalinity 	2/3
E.02	Determine how climate affects soil pH	2/2
E.03	Determine how fertilizer application affects soil pH	2/2
E.04	Determine how soil texture and soil organic matter affect soil buffering	2/3
E.05	Determine how soil pH affects the availability of the primary nutrients	2/3
E.06	List common soil amendments that can raise or lower soil pH <ul style="list-style-type: none"> • Calcite • Dolomite • Ammonium sulfate 	3/3
E.07	Calculate lime amounts to achieve recommended lime requirements	3/3

DUTY F: Demonstrate Knowledge of Nutrient Management Planning

CODE	TASK	F/C
F.01	Construct a yield goal based on production history, soil productivity, and level of management	3/3
F.02	Define terms associated with crop nutrient needs <ul style="list-style-type: none"> • Crop nutrient demand • Crop rotation sequence • Soil productivity • Soil test information 	2/2
F.03	Recognize the components of a nutrient management plan	3/3
F.04	Describe how nutrient loss from soil by erosion, runoff, volatilization, or leaching affects the environment	3/3

DUTY G: Understand Basic Soil Properties*

CODE	TASK	F/C
	Chemical	
G.01	Define anion and cation	2/3
G.02	Define cation exchange capacity (CEC)	1/2
G.03	List the factors that influence CEC <ul style="list-style-type: none"> • Percent clay • Type of clay • Percent organic matter • PH 	2/3
G.04	Define saline, sodic, calcareous, and acid soils	2/2
	Physical	
G.05	Define soil texture	1/2
G.06	Use the textural triangle to identify soil textural class	2/2
G.07	Describe how particle size affects surface area	1/2
G.08	Describe how soil texture affects the water holding capacity, available water, and wilting point of soils	2/3
G.09	Define soil structure	1/2
G.10	Differentiate types of soil structure <ul style="list-style-type: none"> • Blocky • Granular • Platy • Massive 	2/2
G.11	Describe how soil organisms affect soil structure	2/2
	Biological	
G.12	List sources of soil organic matter	2/2
G.13	Describe properties of soil organic matter	2/2
G.14	Describe beneficial effects of soil organic matter	2/3
G.15	Describe how to maintain or increase soil organic matter levels	2/3
G.17	Explain factors influencing soil microbial activity <ul style="list-style-type: none"> • Temperature • Moisture • Soil pH • Organic matter • Salinity 	2/2

	<ul style="list-style-type: none"> Fertilizer application 	
G.18	Explain how the C:N ratio affects organic matter decomposition	2/2

DUTY H: Recognize Characteristics of Soil Erosion

CODE	TASK	F/C
H.01	Describe the erosion processes of detachment, transport, and deposition	2/3
H.02	Define water erosion <ul style="list-style-type: none"> Sheet Rill Gully 	1/2
H.03	Define wind erosion <ul style="list-style-type: none"> Surface creep Saltation Suspension 	1/2
H.04	Explain how factors affect the rate of erosion by water <ul style="list-style-type: none"> Duration and intensity of rainfall Soil texture Slope length Slope percentage Vegetative and residue cover 	3/3
H.05	Explain how factors affect the rate of erosion by wind <ul style="list-style-type: none"> Vegetative and residue cover Wind velocity Unsheltered distance Soil surface roughness 	3/3
H.06	Describe how erosion decreases: <ul style="list-style-type: none"> Crop yield potential Water holding capacity Nutrient content Organic matter content Infiltration Water quality Air quality 	3/3
H.07	Recognize and define types of conservation practices that decrease wind erosion <ul style="list-style-type: none"> Strip cropping Surface residue Cover crops 	3/3
H.08	Recognize and define types of conservation practices that decrease water erosion <ul style="list-style-type: none"> Strip cropping Contouring Terraces Grassed waterways Surface residue Cover crops Row spacing 	2/3

DUTY I: Understand Restrictive Soil Layers

CODE	TASK	F/C
I.01	Describe characteristics of restrictive soil layers <ul style="list-style-type: none"> Subsurface compaction 	1/2

	<ul style="list-style-type: none"> • Surface compaction • Crusting 	
I.02	List causes of restrictive soil layers <ul style="list-style-type: none"> • Subsurface compaction • Surface compaction • Crusting 	2/3
I.03	Explain how restrictive soil layers hinder plant growth	2/2
I.04	Describe methods for preventing and alleviating restricting soil layers	2/2
I.05	Identify sources of information used to determine field limitations <ul style="list-style-type: none"> • Leaching potential • Setback requirements for land applications • Highly erodible land • Wetlands • Sink holes • Endangered or threatened species habitats 	2/2

DUTY J: Utilize Skills Related to Site Characterization

CODE	TASK	F/C
J.01	Locate a tract of land using a legal land description	2/3
J.02	Use a soil survey to locate a tract of land	2/3
J.03	Use a soil survey to determine soil characteristics of a field	2/3

DUTY K: Understand Processes Involving Water and Solute (Soil Solution) Movement

CODE	TASK	F/C
K.01	Describe how soil texture, soil structure, and soil organic matter affect infiltration	2/3
K.02	Define factors that influence surface runoff <ul style="list-style-type: none"> • Infiltration • Landscape position • Permeability • Surface residue cover 	1/2
K.03	Define factors that influence leaching <ul style="list-style-type: none"> • Infiltration • Permeability • Soil depth • Evapotranspiration 	2/2
K.04	Define preferential flow	1/1
K.05	Describe management practices that affect the potential for solute (soil solution) movement <ul style="list-style-type: none"> • Timing and application • Rate of application • Erosion and runoff • Irrigation • Type of tillage operation 	2/2

DUTY L: Understand Plant/Water Relations

CODE	TASK	F/C
L.01	Define soil water terms	2/2

	<ul style="list-style-type: none"> • Saturation • Field capacity • Permanent wilting point • Gravitational water • Plant available water • Evapotranspiration 	
L.02	Describe how factors influence evapotranspiration <ul style="list-style-type: none"> • Wind • Temperature • Solar radiation • Relative humidity • Soil water status • Plant canopy • Crop residue surface cover 	2/2
L.03	Describe the effects of excessive soil moisture on plant nutrient availability and uptake	1/2
L.04	Describe the effects of soil moisture deficiency on plant nutrient availability and uptake	3/2

DUTY M: Demonstrate Knowledge of Irrigation and Drainage

CODE	TASK	F/C
M.01	Define irrigation methods <ul style="list-style-type: none"> • Furrow • Sprinkler • Drip/trickle • LEPA system • Flood • Sub-surface 	1/2
M.02	Define drainage methods <ul style="list-style-type: none"> • Tile • Open ditch • Beds 	1/2

DUTY N: Understand Basic Concepts of Water Quality

CODE	TASK	F/C
N.01	List contaminants in water that come from agriculture	2/2
N.02	Describe how agricultural practices affect drinking water quality	2/2
N.03	Describe how agricultural chemicals and sediments move to off-site areas	2/2
N.04	Identify sources of information that provide drinking water standards	2/2
N.05	Distinguish between nitrogen analysis expressed as nitrate or nitrate-oxygen	2/2
N.06	Identify nitrate and nitrate-oxygen drinking water standards	2/2
N.07	Identify the health effects of drinking water containing nitrate-nitrogen above the drinking water standard	2/2
N.08	Describe how water contamination occurs at a wellhead	1/2
N.09	Explain the purpose of anti-back-siphoning devices	1/2
N.10	Explain how high sediment levels affect surface water quality	2/2
N.11	Explain how nitrogen and phosphorus affect surface and ground water quality	2/2
N.12	Explain the purposes of filter/buffer strips and riparian areas/tree plantings on water quality	2/2

DUTY O: Utilize Principles of Pest Management

CODE	TASK	F/C
	Principles of Integrated pest Management (IPM)	
O.01	Explain the general principles of IPM <ul style="list-style-type: none"> • Sampling and monitoring • Identification • Decision making • Method evaluation • Implementation • Evaluation and record-keeping 	2/2
O.02	List the advantages of using IPM	2/2
	Pest-Ecosystem Interactions	
O.03	Explain the factors that affect pest population development <ul style="list-style-type: none"> • Pathogens, predators, and parasites of pests • Host plants • Initial pest levels • Temperature • Moisture • Humidity • Soil characteristics • Wind 	2/3
O.04	Describe how weed factors affect the ability of weeds to survive and be competitive <ul style="list-style-type: none"> • Growth rate • Seed production • Seed dormancy • Reproduction method 	2/3
O.05	Describe how competition from crops affects weed growth	2/3

DUTY P: Demonstrate Skills Related to Pest Sampling and Monitoring

CODE	TASK	F/C
P.01	List factors to monitor in a pest management program	3/2
P.02	Define sampling methods <ul style="list-style-type: none"> • Direct observation • Presence/absence sampling • Sweep net • Pheromone traps 	3/3
P.03	Identify types of pest distribution patterns <ul style="list-style-type: none"> • Clumped • Uniform • Edge effect 	3/3
P.04	Describe how to prepare and ship samples to a laboratory for evaluation <ul style="list-style-type: none"> • Weeds • Insects • Diseased plants • Soil for nematode analysis 	3/3

DUTY Q: Develop Knowledge of Pest Identification

CODE	TASK	F/C
Q.01	Explain how to identify pests <ul style="list-style-type: none"> • Host crop • Time of year • Symptom appearance and patterns • Physical characteristics of pest • Distribution of pest in field 	2/3
Q.02	List characteristics that distinguish diseases caused by fungi, bacteria, viruses, and nematodes	3/3
Q.03	Differentiate types of insects and mites <ul style="list-style-type: none"> • Type and number of legs • Type of mouth parts • Wing characteristics • Life cycle 	2/3
Q.04	Identify groups of pests <ul style="list-style-type: none"> • Aphids • Beetles • Flies • Leafhoppers • Mites • Moths • Thrips • True bugs • Whiteflies 	3/3
Q.05	Use plant characteristics to differentiate weeds <ul style="list-style-type: none"> • Cotyledons • Arrangement, shape, and vein pattern of leaves • Ligules • Auricles • Hairiness • Shape, color, and size of seed • Stem shape • Life cycle • Root system 	3/3

DUTY R: Utilize Skills Related to Decision Making Guidelines

CODE	TASK	F/C
R.01	Define economic threshold	3/2
R.02	Describe how natural enemies impact pest population projects <ul style="list-style-type: none"> • Beneficials • Pests 	2/2
R.03	Use factors to assess pest populations <ul style="list-style-type: none"> • Current crop pest data from monitoring • Pest history • Pesticide history • Cropping history • Fertility program • Pest mapping 	3/3
R.04	Use information about cost of control, potential pest damage, and crop value to decide if pest control is necessary	3/3

DUTY S: Understand Basic Concepts of Non-Pesticide Management

CODE	TASK	F/C
S.01	Define methods of non-pesticide pest management <ul style="list-style-type: none"> • Genetic • Cultural & mechanical • Biological 	2/3
	Genetic	
S.02	Distinguish differences between genetic tolerance and transgenic resistance	2/2
	Cultural and Mechanical	
S.03	Explain how factors affect pest control <ul style="list-style-type: none"> • Cropping sequence • Strip cropping • Row spacing and plant population • Planting date • Harvest date and method • Tillage • Crop residue • Nutrient and water resources 	3/3
S.04	Describe how to prevent introducing pests into fields	3/3
	Biological	
S.05	Identify biological control agents <ul style="list-style-type: none"> • Lacewings • Ground beetles • Lady beetles • Minute pirate bugs • Nabids • Parasitic wasps • Predatory mites • Spiders • Syrphidly larvae 	2/2

DUTY T: Understand Basic Concepts of Pesticide Management

CODE	TASK	F/C
T.01	Distinguish between contact and translocated pesticides	2/3
T.02	Describe how moisture, temperature, and wind affect pesticide application	3/3
T.03	Define an adjuvant	2/3
T.04	Describe factors that affect spray drift <ul style="list-style-type: none"> • Wind speed • Nozzle characteristics • Boom height • Evaporation rate • Spray viscosity • Spray pressure 	3/3
T.05	Define herbicide uptake, movement, selectivity and carryover	3/3
T.06	List types of herbicide uptake, movement, selectivity and carryover	3/3
T.07	Define placement methods of insecticides <ul style="list-style-type: none"> • Contact • Stomach poison • Systemic • Ovicidal • Juvenile hormone 	3/3

DUTY U: Practice Environmental Stewardship

CODE	TASK	F/C
U.01	List pesticide characteristics that endanger soil and water quality	2/3
U.02	Correctly read and follow a pesticide label <ul style="list-style-type: none"> • Re-Entry Interval (REI) • Information exchange requirements • Personal Protective Equipment (PPE) required by law • Emergency assistance requirements • Oral and posted warning procedures • Site decontamination procedures 	3/3
U.03	Define terms associated with pesticide use <ul style="list-style-type: none"> • Point source pollution • Non-point source pollution • Maximum contaminant level • Parts per million and parts per billion • Pesticide tolerance in the crop 	3/3

DUTY V: Demonstrate Knowledge of Health and Safety Practices

CODE	TASK	F/C
V.01	List pesticide modes of entry into the human system	2/3
V.02	Distinguish between chronic and acute pesticide poisoning	2/3
V.03	Recognize symptoms of acute pesticide poisoning	1/3
V.04	List possible chronic effects of pesticide poisoning	1/3
V.05	Describe procedures to follow if a pesticide gets on skin, in eyes, mouth or stomach, or is inhaled	1/3
V.06	Describe protective gear used while mixing and applying pesticides	3/3
V.07	Describe proper cleanup procedures for application equipment and protective gear	3/3
V.08	Describe proper ways for disposing of pesticides and containers	3/3
V.09	Describe how to store pesticides safely	3/3
V.10	List procedures for handling a pesticide spill	3/3

DUTY W: Recognize Cropping Systems

CODE	TASK	F/C
W.01	List advantages and limitations of single crop and crop rotation systems	2/2
W.02	Describe the role of green manure crops, cover crops, and companion crops in a cropping system	2/2
W.03	Describe cropping sequence in a rotation <ul style="list-style-type: none"> • Tillage options • Residue management • Moisture availability • Pest management 	3/3
W.04	Compare clean-till and high surface residue management systems <ul style="list-style-type: none"> • Crop rooting patterns • Seed placement • Pest management • Stand establishment • Fertilizer placement 	3/3

W.05	Define allelopathy	2/2
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DUTY X: Distinguish Between Hybrid and Variety

CODE	TASK	F/C
X.01	Differentiate hybrid and variety	1/1
X.02	Describe the influences on hybrid and variety selection <ul style="list-style-type: none"> • Maturity • Yield potential • Adaptation to soil and climatic conditions • Yield stability among years and locations • Pest resistance and tolerance • Herbicide sensitivity • Harvestability • End use 	2/2
X.03	Define genetically modified organism (GMO)	2/3
X.04	List advantages and limitations of producing GMOs	2/3
X.05	Explain why randomization and replication are important in well-managed field trials	1/2
X.06	Use least significant difference (LSD) and multiple range test (MRT) values to interpret differences among hybrids and varieties	1/2

DUTY Y: Understand Basic Concepts of Crop Establishment

CODE	TASK	F/C
	Seed Quality	
Y.01	Use seed tag information to determine seed quality	2/2
Y.02	Describe how pre-harvest and harvest conditions influence seed quality	2/2
Y.03	Describe how storage time, handling, and storage conditions affect seed quality	2/2
Y.04	Describe advantages and limitations of protective fungicide seed treatments	2/2
Y.05	Describe advantages and limitations of bacterial inoculants	2/2
Y.06	Describe uses and limitations of the standard germ test	2/2
Y.07	Use purity and germination information to calculate a seeding rate	2/2
	Planting Practices	
Y.08	Describe factors that affect seed germination rate <ul style="list-style-type: none"> • Soil temperature • Soil moisture • Seed/soil contact 	2/2
Y.09	Describe how depth of planting affects crop emergence	2/2
Y.10	List conditions that alter recommended planting depth	2/2
Y.11	Identify factors that influence planting date	2/2
Y.12	Identify limitations of seeding earlier or later than optimum	2/2
Y.13	Describe how factors affect seeding rates <ul style="list-style-type: none"> • Row width • Soil tilth • Climate • Crop residue • Seed size 	2/2
Y.14	Calculate plant population in a field	2/2

Y.15	Differentiate seeding rate and plant population	2/2
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DUTY Z: Demonstrate Knowledge of Crop Growth, Development and Diagnostics

CODE	TASK	F/C
Z.01	Describe characteristics of growth stages <ul style="list-style-type: none"> • Germination and emergence • Vegetative • Flowering • Seed development • Physiological maturity 	3/3
Z.02	Define growing degree unit	2/2
Z.03	Use growing degree units to determine rate of crop development	2/2
Z.04	Describe how day length affects flowering in a short day, long day, and day neutral crops	1/2
Z.05	Locate the growing points in grasses and broadleaf plants	2/2
Z.06	Describe how temperature and moisture extremes affect crops at stages of growth <ul style="list-style-type: none"> • Germination and emergence • Vegetative • Early reproductive 	2/2
Z.07	Describe factors that affect crop canopy closure <ul style="list-style-type: none"> • Row spacing • Plant population • Plant growth habit 	2/2
Z.08	Define terms associated with crop development <ul style="list-style-type: none"> • Summer annual • Winter annual • Biennial • Perennial 	2/2
Z.09	Describe soil factors that affect crop root growth <ul style="list-style-type: none"> • PH • Moisture • Texture and structure • Nutrient status • Fertilizer placement • Soil borne insects and diseases 	3/3
Z.10	Describe how taproot and fibrous root systems differ in erosion control and nutrient uptake patterns	2/2
Z.11	List factors that affect replant decision	2/2
Z.12	List information needed to diagnose a crop production problem in the field	3/3

DUTY AA: Understand Concepts Related to Precision Agriculture

CODE	TASK	F/C
AA.01	Define precision agriculture terms <ul style="list-style-type: none"> • Global positioning systems (GPS) • Remote sensing • Geographic information systems (GIS) • Variable rate technology (VRT) 	2/3
AA.02	Describe the factors that affect yield variability in a field <ul style="list-style-type: none"> • Soil texture 	2/3

	<ul style="list-style-type: none"> • Soil organic matter • Topography • Pest distribution • Previous management 	
AA.03	Explain how producers use yield maps to make crop management decisions	2/3
AA.04	Explain why yield maps vary from year to year	2/2
AA.05	Use a field map to devise a soil or pest sampling strategy	2/2

DUTY BB: Recognize Procedures Related to Harvest and Storage

CODE	TASK	F/C
BB.01	Describe factors that influence harvest time <ul style="list-style-type: none"> • Moisture content • Hybrid or variety characteristics • End use • Weather 	2/2
BB.02	Describe factors that influence crop quality in storage <ul style="list-style-type: none"> • Temperature • Moisture • Aeration • Pests • Crop condition • Post-harvest handling • Length of storage 	2/3
BB.03	Describe how to maintain purity of an identity-preserved (IP) crop	2/2

DUTY CC: Understand Factors Related to Managing Production Risk

CODE	TASK	F/C
CC.01	Describe factors that help manage production risk <ul style="list-style-type: none"> • Crop selection • Hybrid or variety selection • Planting date • Crop insurance 	2/2
CC.02	Describe factors that affect crop management decisions <ul style="list-style-type: none"> • Commodity prices • Input costs • Availability and skill of labor • Equipment • Weather 	2/2