

**HORTICULTURE
GREENHOUSE/
NURSERY TECHNICIAN
SKILLS STANDARDS
OD36202**



*ENDORSED BY
OK TURFGRASS
RESOURCE
FOUNDATION
STATE NURSEYMAN'S
ASSOCIATION
GREENHOUSE
GROWER'S
ASSOCIATION
STATE FLORIST
ASSOCIATION*

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

Copyright 2006
Oklahoma Department of Career and Technology Education
All rights reserved

Printed in the United States of America by the
Oklahoma Department of Career and Technology Education
Stillwater, Oklahoma

The Oklahoma Department of Career and Technology Education does not discriminate on the basis of race, creed, color, national origin, sex, age, veteran status, or qualified handicap.

**HORTICULTURE
GREENHOUSE/NURSERY TECHNICIAN
SKILLS STANDARDS
Frequency and Criticality Ratings**

- Duty A: Demonstrate Employability Skills
- Duty B: Prepare Soil and Growing Media
- Duty C: Propagate Horticultural Plants
- Duty D: Grow Plants
- Duty E: Control Disease, Weeds and Pests
- Duty F: Irrigate Horticultural Crops
- Duty G: Harvest Plants
- Duty H: Store, Ship, Take Inventory, and Maintain Merchandise
- Duty I: Sell Horticultural Products
- Duty J: Operate Equipment
- Duty K: Maintain and Repair Equipment and Facilities
- Duty L: Monitor and Operate Environmental Controls
- Duty M: Plant Identification

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

DUTY A: Demonstrate Employability Skills

CODE	TASK	F/C
A.01	Read, maintain, and follow schedule (responsible, arrive on time.)	3/3
A.02	Dress appropriately	2/2
A.03	Demonstrate an enthusiastic attitude	1/1
A.04	Interpret and follow written and oral directions	3/3
A.05	Use proper telephone skills	2/2
A.06	Use customer service skills	2/2
A.07	Determine daily assignments	2/2
A.08	Train other employees	1/1

A.09	Maintain a courteous and responsive attitude toward all customers and co-workers	3/3
------	--	-----

DUTY B: Prepare Soil and Growing Media

CODE	TASK	F/C
B.01	Pasteurize growing media	3/3
B.02	Sterilize media with chemical soil sterilant <ul style="list-style-type: none"> • Heat • Steam • Chemical • Biological 	3/3
B.03	Mix growing media <ul style="list-style-type: none"> • Media components • Breaking down a media recipe 	3/3
B.04	Adjust pH of growing media <ul style="list-style-type: none"> • Acidity • Alkalinity • Nutrient availability • Optimum level of pH in plants 	2/2
B.05	Incorporate fertilizer into growing media <ul style="list-style-type: none"> • Macronutrients (nitrogen, phosphorus, potassium) • Organic and inorganic • Soil testing 	3/3
B.06	Store growing media <ul style="list-style-type: none"> • Procedures to prevent contamination • Sanitation 	1/1

DUTY C: Propagate Horticultural Plants

CODE	TASK	F/C
C.01	Sow, stratify, and scarify seeds	3/2
C.02	Harden off seedlings	3/2
C.03	Transplant seedlings	3/2
C.04	Take cuttings	3/3
C.05	Apply root hormones <ul style="list-style-type: none"> • Dusting • Dipping • Spraying 	3/3
C.06	Stick cuttings in medium <ul style="list-style-type: none"> • Sand • Vermiculite 	2/1
C.07	Harden off cuttings	2/3
C.08	Propagate plants using air layering	2/2
C.09	Propagate plants by division	3/3
C.10	Operate mist system	3/3
C.11	Label stock plants and cuttings	3/3
C.12	Plant shrubs and trees <ul style="list-style-type: none"> • Bare-root • Container 	3/3

OD36202: Greenhouse/Nursery Technician

	<ul style="list-style-type: none"> • Burlap 	
--	--	--

DUTY D: Grow Plants

CODE	TASK	F/C
D.01	Transplant bare-root plants or liners	3/2
D.02	Prune plants	2/3
D.03	Pot plants	3/3
D.04	Label plants	3/3
D.05	Disbud plants	2/2
D.06	Stake plants	2/2
D.07	Pinch plants	2/2
D.08	Fertilize plants	2/2
D.09	Establish plant spacing <ul style="list-style-type: none"> • Competition for light, water, nutrients, and spacing • Effects of insufficient spacing 	3/3
D.10	Regulate plant photoperiod	2/3
D.11	Apply growth regulator to crops	2/2
D.12	Plant and force bulbs, corms, tubers, and tuberous roots <ul style="list-style-type: none"> • Selection • Growing environments 	2/2
D.13	Determine plant watering needs	3/3

DUTY E: Control Disease, Weeds, and Pests

CODE	TASK	F/C
E.01	Demonstrate safe handling, storage, and application of pesticides	3/3
E.02	Demonstrate first aid treatment for pesticides	1/3
E.03	Clean spray equipment after use	3/3
E.04	Read and interpret label	3/3
E.05	Recognize and remove weeds from potted plants	2/2
E.06	Remove weeds with power tools	2/2
E.07	Control weeds around the premises	2/2
E.08	Discuss greenhouse fumigation	1/3
E.09	Treat bulbs or corms to control insects or diseases	1/2
E.10	Scout for disease, insect problems, and unhealthy plants <ul style="list-style-type: none"> -Identify diseases found -Removal of diseased or infested plants -Insect and non-insect related damage 	3/3
E.11	Apply mulches <ul style="list-style-type: none"> • Reasons for mulching • Varieties of mulches 	2/2
E.12	Discuss Private Applicator's License	2/2

DUTY F: Irrigate Horticultural Crops

CODE	TASK	F/C
F.01	Irrigate field and container-grown plants <ul style="list-style-type: none"> • Methods • Tools 	3/3
F.02	Discuss irrigation systems	2/2

DUTY G: Harvest Plants

CODE	TASK	F/C
G.01	Collect, label, clean, and store seeds	1/1
G.02	Discuss ball trees and shrubs <ul style="list-style-type: none"> • Manual vs. mechanical 	1/1
G.03	Select and prepare plant materials for shipment	3/2
G.04	Grade plant materials <ul style="list-style-type: none"> • Recognize problems • Quality control and plant damage 	1/2
G.05	Inventory plants <ul style="list-style-type: none"> • Recordkeeping • Availability of product 	3/3
G.06	Groom plants for sale <ul style="list-style-type: none"> • Remove dead leaves • Pinching • Pruning 	3/3
G.07	Load and move potted plants to parking area or house	2/2

DUTY H: Store, Ship, Take Inventory, and Maintain Merchandise

CODE	TASK	F/C
H.01	Prepare beds for winter storage of plant materials <ul style="list-style-type: none"> • Heeling in methods • Cold frames • Microfoam and mulching • Temperature control • Moisture regulation 	2/2
H.02	Check received merchandise and plant materials against invoice listings <ul style="list-style-type: none"> • Quality and numbers • Insects and disease 	3/3
H.03	Keep current inventory of products	2/3
H.04	Load delivery vehicle <ul style="list-style-type: none"> • Proper loading and handling techniques • Wind protection • Sequence the drops 	3/3
H.05	Deliver products to customer <ul style="list-style-type: none"> • Being on time • Representing the company • Quality of service • Driving record 	3/3

DUTY I: Sell Horticultural Products

CODE	TASK	F/C
I.01	Use good customer relations	3/3
I.02	Interpret warranties and guarantees for customers <ul style="list-style-type: none"> • Understand company policy 	3/3
I.04	Build (counter and table-top) displays <ul style="list-style-type: none"> • Facing shelves 	1/1
I.05	Build exterior displays <ul style="list-style-type: none"> • Basic marketing 	1/1
I.06	Design and letter show cards	1/1
I.07	Present sales information to customer	3/3
I.08	Prepare sales invoice <ul style="list-style-type: none"> • Write legibly 	2/3
I.09	Deliver products to customer	2/2
I.10	Price horticultural products <ul style="list-style-type: none"> • Basic understanding of profit • Calculate standard markups, markdowns, and profit 	1/1
I.11	Operate cash register <ul style="list-style-type: none"> • Make change 	3/3

DUTY J: Operate Equipment

CODE	TASK	F/C
J.01	Edge a sidewalk with edger	1/1
J.02	Rake leaves with a blower	1/1
J.03	Prepare soil with rotary tiller	1/1
J.04	Mow grass with a mower (rotary or reel-type)	2/2
J.05	Cut grass with string trimmer	2/2
J.06	Compact a newly seeded or sodded lawn with roller	2/2
J.07	Aerate sod	2/3
J.08	Maintain equipment	2/3
J.09	Clean and lubricate equipment <ul style="list-style-type: none"> • Check oil, battery, radiator, air cleaner, tire pressure 	2/3
J.10	Wear proper attire while operating equipment <ul style="list-style-type: none"> • Safety guards 	3/3

DUTY K: Maintain and Repair Equipment and Facilities

CODE	TASK	F/C
K.01	Store flammable materials	2/3
K.02	Prepare equipment for winter storage <ul style="list-style-type: none"> • Clean, repair, repaint 	1/2
K.03	Construct temporary growing structures	2/2
K.04	Sharpen hand tools and blades	2/2
K.05	Perform preventative maintenance on equipment	2/3
K.06	Perform minor engine tune-up	1/2

K.07	Service engine, oil, and filters	1/1
K.08	Clean work area	3/3
K.09	Dispose of waste materials	1/3
K.10	Clean and lubricate equipment	3/3
K.11	Maintain pesticide application equipment <ul style="list-style-type: none"> • Certification requirements 	2/2
K.12	Discuss growing structure heating and cooling systems	3/3
K.13	Order repair parts for equipment <ul style="list-style-type: none"> • Locate model number and serial number • Identify parts for ordering 	1/1

DUTY L: Monitor and Operate Environmental Controls

CODE	TASK	F/C
L.01	Monitor automatic devices to control greenhouse temperature, humidity, and ventilation	3/3
L.02	Install heating cables or mats	1/3
L.03	Discuss shade and black cloth	2/2

DUTY M: Plant Identification

CODE	TASK	F/C
M.01	Properly identify the following cut flowers and foliage: <ul style="list-style-type: none"> • Alstroemeria • Baby's breath • Bird of Paradise • Carnation • Cattleya orchid • Chrysanthemum • Chrysanthemum, Pompon • Cymbidium • Daffodil • Delphinium • Eucalyptus • Fern, Flat • Fern, Leatherleaf or Baker's • Gardenia • Gerbera Daisy • Gladiola • Heather • Huckleberry • Iris • Lemon Leaf or Salal • Marguerite Daisy • Plumosa • Protea • Ranunculus • Rose, Hybrid Tea • Rose, Floribunda or Sweetheart 	3/3

	<ul style="list-style-type: none"> • Rubrum Lily • Scotch Broom • Snapdragon • Statice, seafoam • Stephanotis • Tulip 	
M.02	<p>Properly identify the following deciduous trees:</p> <ul style="list-style-type: none"> • Ash, Green • Birch, River • Crabapple, Flowering • Cypress, Bald • Dogwood, Flowering • Elm, Lacebark • Goldenrain Tree • Honeylocust, Thornless • Maple, Silver • Maple, Sugar • Oak, Pin • Oak, Water • Pear, Bradford • Pistache, Chinese • Purple-leaved Plum • Redbud, Eastern • Russian Olive • Sweetgum, American • Sycamore or American Plane Tree • Weeping willow 	3/3
M.03	<p>Properly identify the following deciduous shrubs:</p> <ul style="list-style-type: none"> • Althea, or Rose-of-Sharon • Barberry, Japanese • Crape Myrtle • "Crimson Pygmy" Barberry • Euonymus, Winged • Flowering Quince • Forsythia or Golden Bell • French Hybrid Lilac • Honeysuckle, Tatarian • Jasmine, Winter • Lilac, Persian • "Linwood Gold" Forsythia • Persian Lilac • Potentilla • Privet • Roses • Spirea, Anthony Waterer 	3/3
M.04	<p>Properly identify the following evergreens:</p> <ul style="list-style-type: none"> • Arborvitae, Oriental • Cedar, Atlas • Cedar, Incense • Creeping Juniper • Juniper, Chinese 	3/3

	<ul style="list-style-type: none"> • Juniper, Rocky Mountain • Pine, Austrian • Pine, Mugo • Pine, Scotch • Pine, Ponderosa • Pine, Slash • Red Cedar, Eastern • Spruce, Colorado Blue 	
M.05	<p>Properly identify the following broad-leaved evergreen trees:</p> <ul style="list-style-type: none"> • Holly, American • Laurel, Cherry • Magnolia, Southern • Oak, Live 	3/3
M.06	<p>Properly identify the following garden annuals:</p> <ul style="list-style-type: none"> • Ageratum • Alyssum • Amaranthus • Balsam (Lady's Slipper) • Begonia • Bells of Ireland • Browallia • Calendula • Calliopsis • Capiseum (Ornamental pepper) • Carnation (annual) • Castor Bean • Celosia (Cockscomb) • Centaurea (Cornflower) • Chrysanthemum (annual) • Cleome (Spiderflower) • Coleus • Cosmos • Dianthus (annual pinks) • Dusty Miller • Gaillardia (annual) • Geranium (seed) • Gomphrena (Globe Amaranth) • Helichrysum (Strawflower) • Impatiens (Sultana) • Lobelia • Marigold • Matricaria (Feverfew) • Nasturtium • Nicotiana (Flowering tobacco) • Nierembergia (Cupflower) • Pansy • Periwinkle • Petunia • Phlox, Drummond (annual) • Portulaca (Rose Moss) • Rudbeckia (Coneflower) 	3/3

	<ul style="list-style-type: none"> • Salvia • Scabiosa (Pincushion flower) • Snapdragon • Sweet peas • Verbena • Zinnia 	
M.07	<p>Properly identify the following garden biennials:</p> <ul style="list-style-type: none"> • Foxglove • Hollyhock • Lunaria (Money plant) • Sweet William 	3/3
M.08	<p>Properly identify the following flowering perennials:</p> <ul style="list-style-type: none"> • Alyssum (perennial) • Asclepias (Butterfly flower) • Candytuft Evergreen • Canna • Columbine • Coreopsis • Chrysanthemum • Daylily • Gaillardia • Hibiscus (Rose Mallow) • Hosta • Iris, Bearded or German • Liatris • Lilly • Peony • Poppy • Phlox (Summer) • Phlox (Creeping) • Pinks • Red Hot Poker • Rudbeckia • Salvia (Farinacea) (Nemorosa) 	3/3
M.09	<p>Properly identify the following ground covers and vines:</p> <ul style="list-style-type: none"> • Ajuga • Andorra Juniper • Bishop's Weed • Boston Ivy • Chinese Wisteria • Euonymus Coloratus • English Ivy • Gray Santolina • Gray Sedum • Japanese Garden Juniper • Liriope • Monkey Grass – Liriope • Mondo Grass – Ophiopogon • Moneywort • Pachysandra • Potentilla 	3/3

	<ul style="list-style-type: none"> • Purple Leaf Winter Creeper Euonymous • Santolina • Sedum • Variegated Liriope • Vinca Major • Vinca Minor 	
M.10	<p>Properly identify the following bulbs:</p> <ul style="list-style-type: none"> • Crocus • Daffodils • Hyacinth • Jonquils • Narcissus • Tulips 	3/3
M.11	<p>Properly identify the following trees:</p> <ul style="list-style-type: none"> • Amur Maple • Bald Cypress • Bradford Pear • Chinese Pistache • Crape Mrytle • Flowering Crabapple • Flowering Dogwood • Fruitless Mulberry • Green Ash • Goldenrain Tree • Japanese Maple • Lacebark Elm • Live Oak • Newport Plum • Redbud • Red Maple • Red Oak • River Birch • Russian Olive • Southern Magnolia • Sugar Maple • Sweetgum • Sycamore • Water Oak • Yaupon Holly 	3/3
M.12	<p>Properly identify the following broadleaved evergreen shrubs:</p> <ul style="list-style-type: none"> • Azalea • Burford Holly • "Carissa" Holly • Dwarf Chinese Holly • Dwarf Yaupon Holly • Dwarf nandina • "Emerald Gaiety" Euonymous • Fraser's Photinia • Glossy Abelia • Gold Dust Aucuba • "Gold Spot" Euonymous 	3/3

	<ul style="list-style-type: none"> • Green Euonymous • Japanese Boxwood • "Manhattan" Euonymous • Nandina • "Victory" Pyracantha 	
M.13	<p>Properly identify the following conifers:</p> <ul style="list-style-type: none"> • Austrian Pine • Canaerti Juniper • Colorado Blue Spruce • Compact Andorra Juniper • Dwarf Alberta Spruce • Pyramidal Arborvitae • Pfitzer Juniper • Scotch Pine • Slash Pine 	3/3