NOCTI **Job Ready Credential Blueprint for Horticulture-Landscaping**		
Specific Standards and Competencies Included in this Assessment	**Location in Text**	**Related Activities**
Related Activity Abbreviations: Thinking Critically **TC**; STEM and Academic Activities **ST**; Communicating about Horticulture **CA**; SAE for ALL Opportunities **SAE**		
General Knowledge		
• Describe knowledge of plant characteristics	CH 7 Plant Taxonomy 178-211 CH 8 Plant Biology 212-237 CH 9 Plant Growth and Development 238-262	TC #2 p197 TC #2 p236 ST #2-#3 p290 ST #1 p440
• Identify parts of a plant and their purpose/function	CH 8 Plant Biology 212-237 Plant Cells 215-218 Plant Tissues 218-221 Plant Parts and Their Functions 222-231	ST #1 p84 ST #4 p84 ST #1-#2 p236 CA #3 p237 TC #2 p261
• Demonstrate knowledge of plant classification/taxonomy	CH 7 Plant Taxonomy 178-211 History of Plant Taxonomy 181 A System of Botanical Classification 181-189 Plant Keys 189-191	ST #4-#5 p197 CA #2 p197 SAE #2 p198 SAE #3 p198 ST #2 p855
• Determine soil pH and possible modification	Potting Medium pH 703-704 Soil pH 305 Optimal pH ranges Figures 11-12 and 11-13 306 Soil Testing 305-307	ST #2 p111 ST #1 p290 ST #2, #3 p320 CA #2 p321 SAE #4, #6 p321 SAE #4 p348
• Describe career opportunities and professional development	**SAE for ALL Profiles:** Sarah Dinger, **Agricultural Education Teacher** 2; SeeTrail Mackey, **National FFA Chief Operating Officer** 28; Brie Arthur, **Garden Writer** 56; Jennifer Frymark, **Gotham Greens** 86; Amanda Thomsen, **Horticultural Marketing** 114; Matt Currin, **Landscape Company Owner** 144; Dr.Andrea Weeks, **Plant Taxonomist** 178; Dr.Tanisha Williams, **Bucknell University, Pennsylvania** 212; Dr.Melodee Fraser, **Turfgrass Breeder** 238; Debbie Roos, **Sustainable Agriculture Extension Agent** 264; Melanie McCaleb, **Erosion Control Specialist** 292; Michelle and Java Bradley, **Java's Composting** 322; Doug Muller, **Seed Savers Exchange** 350; Mark Weathington, **Arboretum Director** 376; Joey	SAE #1 p26 CA #1 p54 SAE #1 p55 TC #1 p83 SAE #1, #3, #5 p85 SAE #1 p112 ST #2 p141 CA #1 p237 SAE #3 p441 SAE #1 p459 SAE #1 p487 SAE #1 p514 SAE #4 p541 SAE #1 p568 SAE #1 p599 SAE #1 p631

	Owle, **Secretary of Agriculture and Natural Resources**, Eastern Band of Cherokee Indians 396; Dr.Travella Free, **State Program Leader and Associate Extension Professor, 4-H Youth Development**, Kentucky State University 418; Ty Strode, **Vice President and Marketing Director** 442; Neil Devaney, **Account Executive, Greenhouse Sales** 460; Josh Tsujimura, **Falls Revival Nursery** 488; Megan Cain, **The ZEN Succulent** 516; Alan **Erwin, Panther Creek Nursery** 542; Ariana de Leña, **Kamayan Farm** 570; Robin Hawley, **Sokol Blosser Winery** 600; Tyler McIntyre, **Landvision Design** 632; Hannah Ross Clarke, **Floral Designer and Grower** 664; Yuko Frazier, **Senior Project Designer, Ambius** 690; Andy Smith, **Erosion Control, Eco Turf** 714; Todd Lawrence, **Golf Course Superintendent** 742; Angélica Varela **Semillas Plant Studio**, Chicago 774; **The Bug Chicks**, Kristie Reddick and Jessica Honaker 802; ; Kristine Dyer, **BioWorks** 830; Jarred Driscoll, **Regulatory Weed Specialist**, North Carolina Department of Agriculture and Consumer Services 862; Kevin Whitten, **Gunters Greenhouses** 884 **Career Connections are found throughout the text:** Agricultural Leadership and Education 22; Agricultural Business and Government 50; Horticultural Communications 80; Horticulture Industry 107; Writing Professional Emails 128; Résumé Tips and Myths 131; Job Interview Mistakes 131; Job Interview Practice Questions 132; Professional Certifications in Horticulture 135; Horticulture Business 137; Horticultural Safety 162; Plant Taxonomy 192; Plant Biology 232; Plant Science 256; Environmental Horticulture 285; Soil Science 315; Plant Nutrition 342; Seed Propagation 369; Stem and Leaf Propagation 390; Layering and Division 412; Grafting and Budding 436; Micropropagation 455; Greenhouse Structures 482; Greenhouse Production 510; Nontraditional Horticulture 537; Nursery Production 564; Olericulture 594; Pomology 625; Landscape Design 658; Floriculture Industry 684; Interior Plantscaping Business and Careers 708; Landscape Installation and Maintenance 735; Sports Turf Industry 767; Integrated Pest Management 792; Entomology 822; Disease Management 850; Weed Management 875; Pesticide Management and Safety 902	SAE #2 p237 ST #5 p261 SAE #1, #3 p262 CA #1 p290 SAE #1 p290 CA #1 p321 SAE #1, #3 p348 SAE #1, #3 p374 SAE #1 p395 CA #3 p417 SAE #1, #3 p417	SAE #1 p663 SAE #1 p689 SAE #1 p713 SAE #1 p741 SAE #1 p773 SAE #1 p798 SAE #1 p828 SAE #1 p856 SAE #1 p880 SAE #1 p907
• Identify plant nutrient requirements	CH 12 Plant Nutrition 322-349 Essential Elements 324-331 Mineral Nutrient Uptake 331-334 Nutrient Sources 334-338 Fertilizer Calculations 339-340	SAE #6 p321 ST #1, #3 p347 CA #2 p348 SAE #2, #3, #5, #6 p348 TC #2 p373	

• Identify types and characteristics of soils and soil components	CH 11 Soils and Media 292-321 Physical Properties of Soil 296-302 Biological Properties of Soil 302-303 Chemical Properties of Soil 303-307 STC: Using the Soil Triangle 308 Soilless Media 307-310	ST #2 p111 ST #2 p197 TC #1 p261 ST #1 p290 ST #1, #3, #5 p320	CA #2 p321 SAE #3, #4, #6 p321 SAE #4 p348 TC #1 p568
• Identify/describe types of fertilizers	Inorganic Fertilizers 337-339 Fertilizer Calculations 339-340 Methods of Fertilizer Application 340-341 Complete and Incomplete Fertilizers 493-496 Soluble and Insoluble 494 Fertilizing (landscape installation) 728-730	ST #4 p347 SAE #5 p348 ST #2 p772	
• List landscaping safety standards	CH 6 Worker and Tool Safety 144-177 Safety and Health Agencies 147-149 Safety Hazards 149-154 Preventing Accidents 154-155 Workplace Safety Documents 155 Practicing Safety 156 Checking and Maintaining Equipment 158-159 Safety First Notes Organic Pesticides 99 Leaf Blower Safety 150 Call 811 Before You Dig 158 Working Safely 160 Weather Hazards 161 Irrigation (greenhouse) 476 Unplug Equipment before Servicing 481 Fertilizer Safety 728 Walk-Behind Mower 761 Windy Days (pesticide application) 894 Agricultural Worker Protection Standard 895 Personal Protective Equipment 895 Rinsing Pesticide Containers Safely 901 Vapors and Gases 151	ST #1, #3 p166 CA #1, #2 p166 SAE #2, #3, #5 p166 SAE #1 p262 SAE #1 p321 SAE #5 p541 SAE #5 p907	

• Define landscaping terminology	Words to Know lists at the beginning of each chapter Words to Know are highlighted in the text Vocabulary Review in the Review and Assessment section at the end of each chapter Glossary of Words to Know	
Pest and Disease Management		
Pest and Disease Management	CH 29 Integrated Pest Management 776-801 CH 30 Insects 802-829 CH 31 Disease Management 830-861 CH 32 Weeds 862-883 CH 33 Pesticide Management and Safety 884-907	ST #4 p772 ST #2-#5 p797 CA #2 p797 SAE #2 p798
• Identify and characterize pests, weed, and disease	Pests 777-781 Pest Identification 786 Recordkeeping and Evaluation Pests and Disorders Identification (illustrated glossary) 799-801 CH 30 Insects 802-829 Anatomy (insects) 804-811 Growth and Development (insects) 811-812 Chemical Signals (insects) 812-814 Taxonomy (insects) 814-816 Agricultural Pests and Beneficials (insects) 816-819 Types of Disease 837-838 Disease Cycle 838-840 Signs and Symptoms of Disease 840 Disease Index 843-849 Disease Identification (illustrated glossary) 857-861 CH 32 Weeds 862-883 Weed Characteristics 865-868 Weed Biology 868-869 Weed Identification 869-871 Weed Identification (illustrated glossary) 881-883	ST #1 p111 CA #2 p772 TC #2 p797 ST #1 p797
• Demonstrate knowledge of pest management safety	Pesticide Application 791 CH 33 Pesticide Management and Safety 884-907	ST #1 p165 CA #1 p166

	Types of Pesticides 886-890 Pesticide Formulations 890-891 Pesticide Labels 891-894 Pesticide Application 894-897 Toxicity 897-900 Storage and Disposal 900-901	SAE #4 p166 TC #1, #2 p906 ST #2-#3 p906 CA #1 p906 SAE #4 p907
• Demonstrate methods of pest, weeds, and disease control, including IPM	Integrated Pest Management for Lawns 757-758 Creating an IPM 776-777 Control Measures 781-782 Inspection and Monitoring 782-786 Action Thresholds 786-787 Corrective Actions 787-791 CH 31 Disease Management 830-861 Managing Plant Diseases 842-843 Weed Management 871-875 CH 33 Pesticide Management and Safety 884-907	TC #1 p712 TC #1, #2 p797 ST #5 p797 SAE #4-#5 p798 SAE #6 p828 ST #2 p906 SAE #2 p907
Fundamentals of Irrigation		
• Describe characteristics of irrigation systems	Sustainable Horticulture: Drip Irrigation 120 Overhead Irrigation 281 Irrigation 283-284 Surface Irrigation 284 Sprinkler Irrigation 284 Drip Irrigation 284 Fertigation 340-341 Subirrigation (greenhouse) 363 Irrigation (greenhouse) 474-476 Water (greenhouse) 496-497 Rainwater Catchment 496 Automated Irrigation Sensors 498 Water Management (nursery) 554-559 Water (vegetable irrigation) 577-579 Efficient Irrigation 649-650	TC #2 p458 CA #1 p514 ST #3 p772

• Describe various water control devices	Equipment and Supplies Identification Illustrated Glossary 168-177	TC #2 p486	
• Identify types of watering techniques	Sustainable Horticulture: Drip Irrigation 120 Overhead Irrigation 281 Irrigation 283-284 Surface Irrigation 284 Sprinkler Irrigation 284 Drip Irrigation 284 Fertigation 340-341 Subirrigation (greenhouse) 363 Irrigation (greenhouse) 474-476 Water (greenhouse) 496-497 Rainwater Catchment 496 Automated Irrigation Sensors 498 Water Management (nursery) 554-559 Water (vegetable irrigation) 577-579		
Basic Nursery/Greenhouse Skills			
• Describe methods of propagation	CH 13 Seed Propagation 350-375 CH 14 Stem and Leaf Propagation 376-395 CH 15 Layering and Division 396-417 CH 16 Grafting and Budding 418-441 CH 17 Tissue Culture: Micropropagation 442-459	CA #1 p374 ST #2 p394 CA #1-#2 p395 SAE #4 p395 TC #2 p416 ST #3 p416	TC #2 p458 ST #5 p459 CA #1 p459 SAE #1-#3 p459 SAE #2 p713
• Explain environmental management of greenhouses	CH 18 Greenhouse Operation and Maintenance 460-487 CH 19 Greenhouse Production 488-515	ST #1 p54 ST #5 p84 CA #1 p166 SAE #6 p262 ST #3 p290 SAE #3 p291 ST #6 p320 ST #2 p374 TC #2 p394 ST #3 p394	ST #3 p416 SAE #5 p417 TC #2 p486 ST #2-#5 p486 CA #1 p486 SAE #1, #2, #4, #5, #6 p487 ST #1-#6 p514 CA #1 p514 SAE #1, #3-#6 p514
• Identify growing structures	CH 18 Greenhouse Operation and Maintenance 460-487	ST #1 p54	

	CH 19 Greenhouse Production 488-515 CH 20 Alternative Growing Methods 516-541 Support Structures (vertical gardening) 529-531 Rooftop Gardening 533-536 Modular Green Roof Systems 535 Pruning and Training (trellises for vine fruit) 609-610 STEM Connection: Espalier 616 Training and Trellising 620-623	ST #3 p111 SAE #4 p291 SAE #6 p487 SAE #6 p514 CA #1 p541 SAE #3 p541 ST #3 p630 CA #1 p630 SAE #6 p631	
Horticulture Business and Retailing	CH 5 Horticultural Business Management 114-143		
• Compute cost of product	Marketing and Advertising 123-126 Price 124 Pricing Strategies Figure 5-11 124 Supply and Demand 446	SAE #2 p27 ST #2 p54 ST #2, #4 p111 CA #3 p112 SAE #6 p262 ST #2-#3 p290 ST #4 p374 CA #1 p374 ST #3 p416 SAE #6 p487 ST #2 p514	ST #2 p541 SAE #2 p631 TC #2 p688 ST #3 p688 SAE #2 p713 ST #5 p740 SAE #6 p741 ST #1 p772 CA #2 p797 SAE #6 p828 SAE #5-#6 p880
• Determine mark-up and profit	Strategic Business Plans 117-121 Pricing Strategies Figure 5-11 124 Principal Strategy 121-123 Marketing and Advertising 123-126 Landscaping Business 732-734	SAE #2 p27 SAE #2 p631	
• Measure for quantity needed		ST #2, #4 p111 ST #1 p662	
• Demonstrate sales techniques	Marketing and Advertising 123-126 Professionalism 126-127	CA #2 p55 ST #5 p142 ST #6 p142 CA #4 p142 SAE #3 p142 SAE #5 p291	ST #5 p142 SAE #2 p321 TC #2 p568 SAE #2 p713 SAE #2 p798 SAE #5 p798

		ST #5 p374 ST #4 p541 SAE #6 p569 SAE #3 p828 SAE #2 p880 SAE #2 p907
• Maintain business records	Keep Records 46-47	ST #1 p25 SAE #5 p112 ST #1 p261 ST #2 p261 ST #3 p459 ST #2 p797
Landscape Design	CH 24 Landscape Design 632-663 CH 26 Interior Plantscaping 690-713	
• Identify landscape areas (private, public, service areas)	The Design Process 635-638	ST #3 p84 ST #6 p320 TC #1 p662 ST #5 p662 CA #2 p663 SAE #5 p663 TC #2 p739 ST #5 p740 CA #2 p740 SAE #3 p741
• Describe material selection and methods of planting	CH 21 Nursery Production 542-569 Elements and Principles of Design 638-644 Plant Selection 648 Planting the Design 723-726 Container-Grown 724 Balled-and-Burlapped 724-725 Bare Root 725 CH 27 Landscape Installation and Maintenance 714-741 Planting Methods (turf) 755-758	ST #2 p84 SAE #4 p262 SAE #6 p321 SAE #4, #6 p599 TC #2 p712 ST #5 p712
• Compute square footage, area, and volume	Garden Plan Figure 22-19 589 Tools of Landscape Design 644-647 STEM Connection: Calculating Mulch 651	ST #3 p84 ST #2, #4 p111 ST #3 p290

Landscape Installation and Construction	CH 27 Landscape Installation and Maintenance 714-741	
• Identify tools and equipment	CH 6 Worker and Tool Safety 144-177 Equipment and Supplies Identification (illustrated glossary 168-177)	ST #2 p166 CA #2 p290 ST #5 p486 ST #4 p879 ST #1 p740
• Read blueprints and lay out site plans	Landscape Design Plans 716-718	ST #3 p374 ST #1 p662 TC #2 p712 ST #5 p740 ST #1 p486 SAE #6 p487 SAE #6 p514 ST #1-#2 p662 SAE #5 p663 ST #2 p712 TC #1-#2 p739 ST #5 p740 CA #3 p740 SAE #4 p741
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• Construct decks, patios, and walkways	Hardscape Installation 719-723	SAE #3 p663 SAE #4 p741 TC #1 p662 TC #1 p739
• Transplant various types of landscape materials	Transplants 590 Plant Selection 648 Planting the Design 723-726 Container-Grown 724 Balled-and-Burlapped 724-725 Bare Root 725	ST #2 p568 SAE #4 p599
Landscape and Turf Maintenance		
• Describe maintenance of equipment	Maintaining Tools and Equipment 157-159 Mower Safety and Maintenance 761-762 Checking and Maintaining Equipment 158	Hands-On Horticulture: Tool Maintenance 159 Hands-On Sharpening Lawn Mower Blades 763 TC #2 p772
• Inspect and operate power equipment	Safety First: Unplug Equipment before Servicing 481 Checking and Maintaining Equipment 158 Mower Safety and Maintenance 761-762	

• Compare types and characteristics of grasses	Turf Applications 746-748 Turfgrass Morphology and Types 748-753 Turf Selection and Timing 753-755	TC #1 p111 ST #4 p111 CA #2 p772
• List types of mowers and their uses	Electric Lawn Mowers 157 Reel Mower 175 Vertical Mower 177 Sustainable Horticulture: Lawn Mowers 651 Mowing 757 Mowing 761 Rotary Mower 161 Reel Mower 761 Mower Safety and Maintenance 761-762 Thatch Control, Verticutter, 762	
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• Identify tree growth characteristics	Growing Practices 92 Plant Identification 199-211 Plant Tissues 218-221 Transpiration 246-248 Field Nurseries (rootstock) 361 Mound Layering 402-403 Preformed Roots 379	TC #1 p373 SAE #5 p569 SAE #6 p631
• Explain treatment of tree disorders and injuries	Stress 277 Wound-Induced Roots 379-380 Bridge Grafting 429-430 Pest Management 617 Wrapping and Staking 726	TC #1 p236 TC #4 p261 TC #1 p440 TC #2 p630 CA #1 p855
• Explain proper pruning techniques	Pruning and Training 613-617 Pruning 730-731	TC (espalier) #2 p440 CA #1 p630 ST #3 p740

Blueprint Contents: General Assessment Information, Written Assessment Information, Specific Competencies Covered in the Test, Performance Assessment Information, Sample Written Items, and Sample Performance Job **Test Type:** The Horticulture-Landscaping industry-based credential is included in NOCTI's Job Ready assessment battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be

used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format. **Revision Team:** The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the states of Idaho, Indiana, Kentucky, Oklahoma, and Pennsylvania. CIP Code 01.0601- Applied Horticulture/Horticulture Operations, General; CTE Career Cluster 1- Agriculture, Food, and Natural Resources; o★net in*it 37-3011.00- Landscaping and Groundskeeping Workers