Applied Horticulture/Horticultural Operations, General, Classification of Instructional Program (CIP) 01.0601
Units of Instruction and Task Grid Linked to Pennsylvania Core Standards

Secondary Competency Task Grid with Unit and Task Numbers	Common Career Technical Core Standards	Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5	Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6	Pennsylvania Core Standards for Mathematics Standard 2.1
100. **SAFETY.**				
101 Identify and follow all general safety, laboratory safety and field-site safety practices and procedures in horticulture. 102 Identify and follow all OSHA safety standards for the horticulture services industry. 103 Identify and follow procedures written in the Safety Data Sheet (SDS) information system. 104 Operate horticulture equipment. 105 Select the proper protective clothing and equipment. 106 RESERVED	**Refer to the end of this document for an explanation of the following standards and sample indicators:** COMMON CAREER TECHNICAL CORE STANDARDS: AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER AG-1, AG-3 PLANT SYSTEMS CAREER PATHWAY None Listed	**KEY IDEAS/DETAILS** ***GRADES 9-10*** Standard PCS.3.5.9-10.A Standard PCS.3.5.9-10.B Standard PCS.3.5.9-10.C ***GRADES 11-12*** Standard PCS.3.5.11-12A Standard PCS.3.5.11-12.B Standard PCS.3.5.11-12.C **CRAFT AND STRUCTURE** ***GRADES 9-10*** Standard PCS.3.5.9-10.D. Standard PCS.3.5.9-10.E Standard PCS.3.5.9-10.F ***GRADES 11-12*** Standard PCS.3.5.11-12.D Standard PCS.3.5.11-12.E Standard PCS.3.5.11-12.F	**TEXT TYPES/ PURPOSE** ***GRADES 9-10*** Standard PCS.3.6.9-10.A Standard PCS.3.6.9-10.B ***GRADES 11-12*** Standard PCS.3.6.11-12.A Standard PCS.3.6.11-12.B **PRODUCTION AND DISTRIBUTION OF WRITING** ***GRADES 9-10*** Standard PCS.3.6.9-10.C Standard PCS.3.6.9-10 D Standard PCS.3.6.9-10.E ***GRADES 11-12*** Standard PCS.3.6.11-12 C Standard.PCS.3.6.11-12.D	**NUMBERS AND OPERATIONS** Standard PCS.2.1.HS.F.1 Standard PCS.2.1.HS.F.2 Standard PCS.2.1.HS.F.3 Standard PCS.2.1.HS.F.4 Standard PCS.2.1.HS.F.5 Standard PCS.2.1.HS.F.6 Standard PCS.2.1.HS.F.7

			INTEGRATE KNOWLEDGE/IDEAS ***GRADES 9-10*** Standard PCS.3.5.9-10.G Standard PCS.3.5.9-10.H Standard PCS.3.5.9-10.I ***GRADES 9-12*** Standard PCS.3.5.11-12.G Standard PCS.3.5.11-12.H Standard PCS.3.5.11-12.I **RANGE OF READING/LEVEL OF COMPLEX TEXTS** ***GRADES 9-10*** Standard PCS.3.5.9-10.J ***GRADES 11-12*** Standard PCS.3.5.11-12.J	Standard PCS.3.6.11- 12 E **RESEARCH** ***GRADES 9-10*** Standard PCS.3.6.9-10.F Standard PCS.3.6.9-10.G Standard PCS.3.6.9-10.H ***GRADES 11-12*** Standard PCS.3.6.11-12.F Standard PCS.3.6.11-12.G Standard PCS.3.6.11-12.H **RANGE OF WRITING** ***GRADES 9-10*** Standard PCS.3.5.9-10.I ***GRADES 11-12***	
200	**SAFE AND PROPER PLANT HEALTH CARE PRACTICES.**				
201 202 203 204 205 206 207 208 209	Control weeds, insects, and plant diseases. Interpret horticulture product labels. Calculate and mix quantities of horticultural products used in plant health care. RESERVED Define the concept of, "Plant Health Care," such as disease, nutrients etc. Distinguish the components of an Integrated Pest Management program including the effects of chemicals and pesticides on the environment. Identify various horticultural pests including their signs and symptoms. RESERVED Prepare for PA Pesticide Certification.	**Refer to the end of this document for an explanation of the following standards and sample indicators:** **COMMON CAREER TECHNICAL CORE STANDARDS:** **AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER** **AG-3**	**KEY IDEAS/DETAILS** ***GRADES 9-10*** Standard PCS.3.5.9-10.A Standard PCS.3.5.9-10.B Standard PCS.3.5.9-10.C ***GRADES 11-12*** Standard PCS.3.5.11-12A Standard PCS.3.5.11-12.B Standard PCS.3.5.11-12.C **CRAFT AND STRUCTURE** ***GRADES 9-10*** Standard PCS.3.5.9-10.D.	**TEXT TYPES/ PURPOSE** **GRADES 9-10** **Standard PCS.3.6.9-10.A** **Standard PCS.3.6.9-10.B** **GRADES 11-12** **Standard PCS.3.6.11-12.A** **Standard PCS.3.6.11-12.B** **PRODUCTION AND DISTRIBUTION OF WRITING** **GRADES 9-10** **Standard PCS.3.6.9-10.C** **Standard PCS.3.6.9-10 D** **Standard PCS.3.6.9-10.E**	**NUMBERS AND OPERATIONS** **Standard PCS.2.1.HS.F.1** **Standard PCS.2.1.HS.F.2** **Standard PCS.2.1.HS.F.3** **Standard PCS.2.1.HS.F.4** **Standard PCS.2.1.HS.F.5** **Standard PCS.2.1.HS.F.6** **Standard PCS.2.1.HS.F.7**

		PLANT SYSTEMS CAREER PATHWAY **AG-PL1** **AG-PL3**	Standard PCS.3.5.9-10.E Standard PCS.3.5.9-10.F ***GRADES 11-12*** Standard PCS.3.5.11-12.D Standard PCS.3.5.11-12.E Standard PCS.3.5.11-12.F **INTEGRATE KNOWLEDGE/IDEAS** ***GRADES 9-10*** Standard PCS.3.5.9-10.G Standard PCS.3.5.9-10.H Standard PCS.3.5.9-10.I ***GRADES 9-12*** Standard PCS.3.5.11-12.G Standard PCS.3.5.11-12.H Standard PCS.3.5.11-12.I **RANGE OF READING/LEVEL OF COMPLEX TEXTS** ***GRADES 9-10*** Standard PCS.3.5.9-10.J ***GRADES 11-12*** Standard PCS.3.5.11-12.J	**GRADES 11-12** **Standard PCS.3.6.11-12 C** **Standard.PCS.3.6.11-12.D** **Standard PCS.3.6.11- 12 E** **RESEARCH** **GRADES 9-10** **Standard PCS.3.6.9-10.F** **Standard PCS.3.6.9-10.G** **Standard PCS.3.6.9-10.H** **GRADES 11-12** **Standard PCS.3.6.11-12.F** **Standard PCS.3.6.11-12.G** **Standard PCS.3.6.11-12.H** **RANGE OF WRITING** **GRADES 9-10** **Standard PCS.3.5.9-10.I** **GRADES 11-12**	
300	**BASIC BOTANY.**				
301 302 303 304 305	Describe the process of photosynthesis, respiration, translocation, and transpiration. Identify plant cell structure, organization, and function. Identify plant structures and explain their functions. Identify conditions essential for seed germination. Explain the environmental factors that affect the growth and development of a plant.	**Refer to the end of this document for an explanation of the following standards and sample indicators:** **COMMON CAREER TECHNICAL CORE STANDARDS:**	**KEY IDEAS/DETAILS** **GRADES 9-10** **Standard PCS.3.5.9-10.A** **Standard PCS.3.5.9-10.B** **Standard PCS.3.5.9-10.C** **GRADES 11-12** **Standard PCS.3.5.11-12A** **Standard PCS.3.5.11-12.B**	**TEXT TYPES/ PURPOSE** **GRADES 9-10** **Standard PCS.3.6.9-10.A** **Standard PCS.3.6.9-10.B** **GRADES 11-12** **Standard PCS.3.6.11-12.A** **Standard PCS.3.6.11-12.B**	

306 Distinguish between sexual and asexual plant reproduction. 307 Identify plant nutrient requirements. 308 Describe the nutrient cycles. 309 Classify plants and use appropriate binomial taxonomic terminology. 310 Describe techniques used to control environmental factors. 311 Describe how weather and climate impact growing conditions and plant selection.		**AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER** **AG-1** **PLANT SYSTEMS CAREER PATHWAY** **AG-PL2** **AG-PL3**	**Standard PCS.3.5.11-12.C** **CRAFT AND STRUCTURE** **GRADES 9-10** **Standard PCS.3.5.9-10.D.** **Standard PCS.3.5.9-10.E** **Standard PCS.3.5.9-10.F** **GRADES 11-12** **Standard PCS.3.5.11-12.D** **Standard PCS.3.5.11-12.E** **Standard PCS.3.5.11-12.F** **INTEGRATE KNOWLEDGE/IDEAS** **GRADES 9-10** **Standard PCS.3.5.9-10.G** **Standard PCS.3.5.9-10.H** **Standard PCS.3.5.9-10.I** **GRADES 9-12** **Standard PCS.3.5.11-12.G** **Standard PCS.3.5.11-12.H** **Standard PCS.3.5.11-12.I** **RANGE OF READING/LEVEL OF COMPLEX TEXTS** **GRADES 9-10** **Standard PCS.3.5.9-10.J** **GRADES 11-12** **Standard PCS.3.5.11-12.J**	**PRODUCTION AND DISTRIBUTION OF WRITING** **GRADES 9-10** **Standard PCS.3.6.9-10.C** **Standard PCS.3.6.9-10 D** **Standard PCS.3.6.9-10.E** **GRADES 11-12** **Standard PCS.3.6.11-12 C** **Standard.PCS.3.6.11-12.D** **Standard PCS.3.6.11- 12 E** **RANGE OF WRITING** **GRADES 9-10** **Standard PCS.3.5.9-10.I** **GRADES 11-12**	
400	**HORTICULTURE BUSINESS OPERATIONS.**				
401 Determine criteria for selecting a site for a horticulture business. 402 Research state and local requirements for horticulture businesses. 403 Develop a horticultural business plan. 404 Analyze pricing and mark-up techniques.		**Refer to the end of this document for an explanation of the following standards and sample indicators:**	**KEY IDEAS/DETAILS** **GRADES 9-10** **Standard PCS.3.5.9-10.A** **Standard PCS.3.5.9-10.B** **Standard PCS.3.5.9-10.C**	**TEXT TYPES/ PURPOSE** **GRADES 9-10** **Standard PCS.3.6.9-10.A** **Standard PCS.3.6.9-10.B** **GRADES 11-12**	**NUMBERS AND OPERATIONS** **Standard PCS.2.1.HS.F.1** **Standard PCS.2.1.HS.F.2**

405 Determine human resource needs and business ethics in a horticulture business. 406 Research vendors to obtain product information. 407 Perform appropriate customer/client relationship attributes. 408 Identify and develop various horticulture record keeping systems. 409 Analyze record keeping system to determine best management practices. 410 RESERVED	**COMMON CAREER TECHNICAL CORE STANDARDS:** **AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER AG-5** **PLANT SYSTEMS CAREER PATHWAY AG-PL3**	**GRADES 11-12** **Standard PCS.3.5.11-12A** **Standard PCS.3.5.11-12.B** **Standard PCS.3.5.11-12.C** **CRAFT AND STRUCTURE** **GRADES 9-10** **Standard PCS.3.5.9-10.D.** **Standard PCS.3.5.9-10.E** **Standard PCS.3.5.9-10.F** **GRADES 11-12** **Standard PCS.3.5.11-12.D** **Standard PCS.3.5.11-12.E** **Standard PCS.3.5.11-12.F** **INTEGRATE KNOWLEDGE/IDEAS** **GRADES 9-10** **Standard PCS.3.5.9-10.G** **Standard PCS.3.5.9-10.H** **Standard PCS.3.5.9-10.I** **GRADES 9-12** **Standard PCS.3.5.11-12.G** **Standard PCS.3.5.11-12.H** **Standard PCS.3.5.11-12.I** **RANGE OF READING/LEVEL OF COMPLEX TEXTS** **GRADES 9-10** **Standard PCS.3.5.9-10.J** **GRADES 11-12** **Standard PCS.3.5.11-12.J**	**Standard PCS.3.6.11-12.A** **Standard PCS.3.6.11-12.B** **PRODUCTION AND DISTRIBUTION OF WRITING** **GRADES 9-10** **Standard PCS.3.6.9-10.C** **Standard PCS.3.6.9-10 D** **Standard PCS.3.6.9-10.E** **GRADES 11-12** **Standard PCS.3.6.11-12 C** **Standard.PCS.3.6.11-12.D** **Standard PCS.3.6.11- 12 E** **RESEARCH** **GRADES 9-10** **Standard PCS.3.6.9-10.F** **Standard PCS.3.6.9-10.G** **Standard PCS.3.6.9-10.H** **GRADES 11-12** **Standard PCS.3.6.11-12.F** **Standard PCS.3.6.11-12.G** **Standard PCS.3.6.11-12.H** **RANGE OF WRITING** **GRADES 9-10** **Standard PCS.3.5.9-10.I** **GRADES 11-12**	**Standard PCS.2.1.HS.F.3** **Standard PCS.2.1.HS.F.4** **Standard PCS.2.1.HS.F.5** **Standard PCS.2.1.HS.F.6** **Standard PCS.2.1.HS.F.7** **MEASUREMENT, DATA AND PROBABILITY** **Standard PCS.2.4.HS.B.1** **Standard PCS.2.4.HS.B.2** **Standard PCS.2.4.HS.B.3** **Standard PCS.2.4.HS.B.4** **Standard PCS.2.4.HS.B.5** **Standard PCS.2.4.HS.B.6** **Standard PCS.2.4.HS.B.7**
500 SOILS AND FERTILIZER.					
501 Identify and describe soil characteristics. 502 Identify soil and/or plant nutrients. 503 Describe soil management techniques.	**Refer to the end of this document for an explanation of the**	**KEY IDEAS/DETAILS** **GRADES 9-10** **Standard PCS.3.5.9-10.A**	**TEXT TYPES/ PURPOSE** **GRADES 9-10** **Standard PCS.3.6.9-10.A**	**NUMBERS AND OPERATIONS** **Standard PCS.2.1.HS.F.1**	

504 Conduct proper soil sampling techniques. 505 Test soil for pH, texture, macronutrients, and soluble salts. 506 Interpret commercial soil test reports. 507 Describe criteria for selecting fertilizers and soil amendments. 508 Describe factors influencing fertilizer application. 509 RESERVED 510 RESERVED 511 RESERVED 512 Identify current issues regarding plant and soil management that impacts agronomic and horticultural practices.	**following standards and sample indicators:** **COMMON CAREER TECHNICAL CORE STANDARDS:** **AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER** **AG-4** **PLANT SYSTEMS CAREER PATHWAY** **AG-PL1** **AG-PL3**	**Standard PCS.3.5.9-10.B** **Standard PCS.3.5.9-10.C** **GRADES 11-12** **Standard PCS.3.5.11-12A** **Standard PCS.3.5.11-12.B** **Standard PCS.3.5.11-12.C** **CRAFT AND STRUCTURE** **GRADES 9-10** **Standard PCS.3.5.9-10.D.** **Standard PCS.3.5.9-10.E** **Standard PCS.3.5.9-10.F** **GRADES 11-12** **Standard PCS.3.5.11-12.D** **Standard PCS.3.5.11-12.E** **Standard PCS.3.5.11-12.F** **INTEGRATE KNOWLEDGE/IDEAS** **GRADES 9-10** **Standard PCS.3.5.9-10.G** **Standard PCS.3.5.9-10.H** **Standard PCS.3.5.9-10.I** **GRADES 9-12** **Standard PCS.3.5.11-12.G** **Standard PCS.3.5.11-12.H** **Standard PCS.3.5.11-12.I** **RANGE OF READING/LEVEL OF COMPLEX TEXTS** **GRADES 9-10** **Standard PCS.3.5.9-10.J** **GRADES 11-12** **Standard PCS.3.5.11-12.J**	**Standard PCS.3.6.9-10.B** **GRADES 11-12** **Standard PCS.3.6.11-12.A** **Standard PCS.3.6.11-12.B** **PRODUCTION AND DISTRIBUTION OF WRITING** **GRADES 9-10** **Standard PCS.3.6.9-10.C** **Standard PCS.3.6.9-10 D** **Standard PCS.3.6.9-10.E** **GRADES 11-12** **Standard PCS.3.6.11-12 C** **Standard.PCS.3.6.11-12.D** **Standard PCS.3.6.11- 12 E** **RANGE OF WRITING** **GRADES 9-10** **Standard PCS.3.5.9-10.I** **GRADES 11-12**	**Standard PCS.2.1.HS.F.2** **Standard PCS.2.1.HS.F.3** **Standard PCS.2.1.HS.F.4** **Standard PCS.2.1.HS.F.5** **Standard PCS.2.1.HS.F.6** **Standard PCS.2.1.HS.F.7**
600 SUSTAINABLE HORTICULTURE.					

601 Identify different methods of sustainable horticulture. 602 Compare sustainable watering and fertilizing techniques to conventional techniques. 603 Compare sustainable plant material selection to conventional plant material. 604 Recycle horticultural waste. 605 RESERVED	**Refer to the end of this document for an explanation of the following standards and sample indicators:** **COMMON CAREER TECHNICAL CORE STANDARDS:** **AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER** **AG-4, AG-** **PLANT SYSTEMS CAREER PATHWAY** **AG-PL1** **AG-PL2** **AG-PL3**	**KEY IDEAS/DETAILS** **GRADES 9-10** **Standard PCS.3.5.9-10.A** **Standard PCS.3.5.9-10.B** **Standard PCS.3.5.9-10.C** **GRADES 11-12** **Standard PCS.3.5.11-12A** **Standard PCS.3.5.11-12.B** **Standard PCS.3.5.11-12.C** **CRAFT AND STRUCTURE** **GRADES 9-10** **Standard PCS.3.5.9-10.D.** **Standard PCS.3.5.9-10.E** **Standard PCS.3.5.9-10.F** **GRADES 11-12** **Standard PCS.3.5.11-12.D** **Standard PCS.3.5.11-12.E** **Standard PCS.3.5.11-12.F** **INTEGRATE KNOWLEDGE/IDEAS** **GRADES 9-10** **Standard PCS.3.5.9-10.G** **Standard PCS.3.5.9-10.H** **Standard PCS.3.5.9-10.I** **GRADES 9-12** **Standard PCS.3.5.11-12.G** **Standard PCS.3.5.11-12.H** **Standard PCS.3.5.11-12.I** **RANGE OF READING/LEVEL OF COMPLEX TEXTS** **GRADES 9-10** **Standard PCS.3.5.9-10.J** **GRADES 11-12** **Standard PCS.3.5.11-12.J**	**TEXT TYPES/ PURPOSE** **GRADES 9-10** **Standard PCS.3.6.9-10.A** **Standard PCS.3.6.9-10.B** **GRADES 11-12** **Standard PCS.3.6.11-12.A** **Standard PCS.3.6.11-12.B** **PRODUCTION AND DISTRIBUTION OF WRITING** **GRADES 9-10** **Standard PCS.3.6.9-10.C** **Standard PCS.3.6.9-10 D** **Standard PCS.3.6.9-10.E** **GRADES 11-12** **Standard PCS.3.6.11-12 C** **Standard.PCS.3.6.11-12.D** **Standard PCS.3.6.11- 12 E** **RANGE OF WRITING** **GRADES 9-10** **Standard PCS.3.5.9-10.I** **GRADES 11-12**	

700	**HORTICULTURE TECHNOLOGY.**				
701	Explain the uses of technologically altered plants.	**Refer to the end of this document for an explanation of the following standards and sample indicators:** **COMMON CAREER TECHNICAL CORE STANDARDS:** **AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER** **AG-1, AG-2** **PLANT SYSTEMS CAREER PATHWAY** **AG-PL1** **AG-PL3**	**KEY IDEAS/DETAILS** **GRADES 9-10** **Standard PCS.3.5.9-10.A** **Standard PCS.3.5.9-10.B** **Standard PCS.3.5.9-10.C** **GRADES 11-12** **Standard PCS.3.5.11-12A** **Standard PCS.3.5.11-12.B** **Standard PCS.3.5.11-12.C** **CRAFT AND STRUCTURE** **GRADES 9-10** **Standard PCS.3.5.9-10.D.** **Standard PCS.3.5.9-10.E** **Standard PCS.3.5.9-10.F** **GRADES 11-12** **Standard PCS.3.5.11-12.D** **Standard PCS.3.5.11-12.E** **Standard PCS.3.5.11-12.F** **INTEGRATE KNOWLEDGE/IDEAS** **GRADES 9-10** **Standard PCS.3.5.9-10.G** **Standard PCS.3.5.9-10.H** **Standard PCS.3.5.9-10.I** **GRADES 9-12** **Standard PCS.3.5.11-12.G** **Standard PCS.3.5.11-12.H** **Standard PCS.3.5.11-12.I** **RANGE OF READING/LEVEL OF COMPLEX TEXTS** **GRADES 9-10** **Standard PCS.3.5.9-10.J**	**TEXT TYPES/ PURPOSE** **GRADES 9-10** **Standard PCS.3.6.9-10.A** **Standard PCS.3.6.9-10.B** **GRADES 11-12** **Standard PCS.3.6.11-12.A** **Standard PCS.3.6.11-12.B** **PRODUCTION AND DISTRIBUTION OF WRITING** **GRADES 9-10** **Standard PCS.3.6.9-10.C** **Standard PCS.3.6.9-10 D** **Standard PCS.3.6.9-10.E** **GRADES 11-12** **Standard PCS.3.6.11-12 C** **Standard.PCS.3.6.11-12.D** **Standard PCS.3.6.11- 12 E** **RESEARCH** **GRADES 9-10** **Standard PCS.3.6.9-10.F** **Standard PCS.3.6.9-10.G** **Standard PCS.3.6.9-10.H** **GRADES 11-12** **Standard PCS.3.6.11-12.F** **Standard PCS.3.6.11-12.G** **Standard PCS.3.6.11-12.H** **RANGE OF WRITING** **GRADES 9-10** **Standard PCS.3.5.9-10.I** **GRADES 11-12**	
702	RESERVED				
703	RESERVED				
704	Research advanced and emerging technologies in horticulture.				
705	Perform a Point of Sale (POS) transaction.				

			GRADES 11-12 **Standard PCS.3.5.11-12.J**		
800	**HISTORY AND CURRENT STATUS OF HORTICULTURE.**				
801 802 803 804 805 806	Describe major historical developments in the field of horticulture. Compare/contrast the effect human beings have had on various plant species. Determine how development of certain plant species has affected cultural development. Describe the role horticulture plays in the economy of the state and nation. RESERVED Critique the impact of that botanical gardens, public parks, and plants have on people in a society.	**Refer to the end of this document for an explanation of the following standards and sample indicators:** **COMMON CAREER TECHNICAL CORE STANDARDS:** **AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER** **AG-1, AG-2, AG-4, AG-5** **PLANT SYSTEMS CAREER PATHWAY** **AG-PL3**	**KEY IDEAS/DETAILS** **GRADES 9-10** **Standard PCS.3.5.9-10.A** **Standard PCS.3.5.9-10.B** **Standard PCS.3.5.9-10.C** **GRADES 11-12** **Standard PCS.3.5.11-12A** **Standard PCS.3.5.11-12.B** **Standard PCS.3.5.11-12.C** **CRAFT AND STRUCTURE** **GRADES 9-10** **Standard PCS.3.5.9-10.D.** **Standard PCS.3.5.9-10.E** **Standard PCS.3.5.9-10.F** **GRADES 11-12** **Standard PCS.3.5.11-12.D** **Standard PCS.3.5.11-12.E** **Standard PCS.3.5.11-12.F** **INTEGRATE KNOWLEDGE/IDEAS** **GRADES 9-10** **Standard PCS.3.5.9-10.G** **Standard PCS.3.5.9-10.H** **Standard PCS.3.5.9-10.I** **GRADES 9-12** **Standard PCS.3.5.11-12.G** **Standard PCS.3.5.11-12.H** **Standard PCS.3.5.11-12.I**	**TEXT TYPES/ PURPOSE** **GRADES 9-10** **Standard PCS.3.6.9-10.A** **Standard PCS.3.6.9-10.B** **GRADES 11-12** **Standard PCS.3.6.11-12.A** **Standard PCS.3.6.11-12.B** **PRODUCTION AND DISTRIBUTION OF WRITING** **GRADES 9-10** **Standard PCS.3.6.9-10.C** **Standard PCS.3.6.9-10 D** **Standard PCS.3.6.9-10.E** **GRADES 11-12** **Standard PCS.3.6.11-12 C** **Standard.PCS.3.6.11-12.D** **Standard PCS.3.6.11- 12 E** **RESEARCH** **GRADES 9-10** **Standard PCS.3.6.9-10.F** **Standard PCS.3.6.9-10.G** **Standard PCS.3.6.9-10.H** **GRADES 11-12** **Standard PCS.3.6.11-12.F** **Standard PCS.3.6.11-12.G** **Standard PCS.3.6.11-12.H** **RANGE OF WRITING** **GRADES 9-10** **Standard PCS.3.5.9-10.I**	

			RANGE OF READING/LEVEL OF COMPLEX TEXTS **GRADES 9-10** **Standard PCS.3.5.9-10.J** **GRADES 11-12** **Standard PCS.3.5.11-12.J**	**GRADES 11-12**	
900	**PLANT IDENTIFICATION.**				
901 902 903 904	Outline the proper use of plant material in various segments of the horticulture industry. Determine the impact of environmental factors on plant materials. List the identifying characteristics of various plant categories including woody and herbaceous plants in the horticulture industry. Identify 100 plants used in horticulture industry by horticultural reference/botanical reference. (70 need to be deciduous, evergreen, annuals, perennials, and house plants)	**Refer to the end of this document for an explanation of the following standards and sample indicators:** **COMMON CAREER TECHNICAL CORE STANDARDS:** **AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER** **AG-1** **PLANT SYSTEMS CAREER PATHWAY** **AG-PL2** **AG-PL3**	**KEY IDEAS/DETAILS** **GRADES 9-10** **Standard PCS.3.5.9-10.A** **Standard PCS.3.5.9-10.B** **Standard PCS.3.5.9-10.C** **GRADES 11-12** **Standard PCS.3.5.11-12A** **Standard PCS.3.5.11-12.B** **Standard PCS.3.5.11-12.C** **CRAFT AND STRUCTURE** **GRADES 9-10** **Standard PCS.3.5.9-10.D.** **Standard PCS.3.5.9-10.E** **Standard PCS.3.5.9-10.F** **GRADES 11-12** **Standard PCS.3.5.11-12.D** **Standard PCS.3.5.11-12.E** **Standard PCS.3.5.11-12.F** **INTEGRATE KNOWLEDGE/IDEAS** **GRADES 9-10** **Standard PCS.3.5.9-10.G** **Standard PCS.3.5.9-10.H** **Standard PCS.3.5.9-10.I** **GRADES 9-12** **Standard PCS.3.5.11-12.G** **Standard PCS.3.5.11-12.H** **Standard PCS.3.5.11-12.I**	**TEXT TYPES/ PURPOSE** **GRADES 9-10** **Standard PCS.3.6.9-10.A** **Standard PCS.3.6.9-10.B** **GRADES 11-12** **Standard PCS.3.6.11-12.A** **Standard PCS.3.6.11-12.B** **PRODUCTION AND DISTRIBUTION OF WRITING** **GRADES 9-10** **Standard PCS.3.6.9-10.C** **Standard PCS.3.6.9-10 D** **Standard PCS.3.6.9-10.E** **GRADES 11-12** **Standard PCS.3.6.11-12 C** **Standard.PCS.3.6.11-12.D** **Standard PCS.3.6.11- 12 E** **RESEARCH** **GRADES 9-10** **Standard PCS.3.6.9-10.F** **Standard PCS.3.6.9-10.G** **Standard PCS.3.6.9-10.H** **GRADES 11-12** **Standard PCS.3.6.11-12.F** **Standard PCS.3.6.11-12.G** **Standard PCS.3.6.11-12.H**	

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1000 HORTICULTURAL CAREERS AND OPPORTUNITIES.				
1001 Describe careers and working conditions in the Horticulture industry. 1002 Perform job readiness skills needed in the Horticulture industry. 1003 Research horticultural industry certifications. 1004 Explore post-secondary opportunities.	**Refer to the end of this document for an explanation of the following standards and sample indicators:** **COMMON CAREER TECHNICAL CORE STANDARDS:** **AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER** **AG-1** **PLANT SYSTEMS CAREER PATHWAY** **AG-PL2** **AG-PL3**	**KEY IDEAS/DETAILS** **GRADES 9-10** **Standard PCS.3.5.9-10.A** **Standard PCS.3.5.9-10.B** **Standard PCS.3.5.9-10.C** **GRADES 11-12** **Standard PCS.3.5.11-12A** **Standard PCS.3.5.11-12.B** **Standard PCS.3.5.11-12.C** **CRAFT AND STRUCTURE** **GRADES 9-10** **Standard PCS.3.5.9-10.D.** **Standard PCS.3.5.9-10.E** **Standard PCS.3.5.9-10.F** **GRADES 11-12** **Standard PCS.3.5.11-12.D** **Standard PCS.3.5.11-12.E** **Standard PCS.3.5.11-12.F** **INTEGRATE KNOWLEDGE/IDEAS** **GRADES 9-10** **Standard PCS.3.5.9-10.G** **Standard PCS.3.5.9-10.H** **Standard PCS.3.5.9-10.I** **GRADES 9-12** **Standard PCS.3.5.11-12.G**	**TEXT TYPES/ PURPOSE** **GRADES 9-10** **Standard PCS.3.6.9-10.A** **Standard PCS.3.6.9-10.B** **GRADES 11-12** **Standard PCS.3.6.11-12.A** **Standard PCS.3.6.11-12.B** **PRODUCTION AND DISTRIBUTION OF WRITING** **GRADES 9-10** **Standard PCS.3.6.9-10.C** **Standard PCS.3.6.9-10 D** **Standard PCS.3.6.9-10.E** **GRADES 11-12** **Standard PCS.3.6.11-12 C** **Standard.PCS.3.6.11-12.D** **Standard PCS.3.6.11- 12 E** **RESEARCH** **GRADES 9-10** **Standard PCS.3.6.9-10.F** **Standard PCS.3.6.9-10.G** **Standard PCS.3.6.9-10.H** **GRADES 11-12** **Standard PCS.3.6.11-12.F** **Standard PCS.3.6.11-12.G**	

		Standard PCS.3.5.11-12.H **Standard PCS.3.5.11-12.I** **RANGE OF READING/LEVEL OF COMPLEX TEXTS** **GRADES 9-10** **Standard PCS.3.5.9-10.J** **GRADES 11-12** **Standard PCS.3.5.11-12.J**	**Standard PCS.3.6.11-12.H** **RANGE OF WRITING** **GRADES 9-10** **Standard PCS.3.5.9-10.I** **GRADES 11-12**	
1100 HORTICULTURAL PATHWAYS.				
1101 Describe and apply principles of landscape, hardscape, or floral design. 1102 Create various horticulture designs. 1103 Calculate measurements, areas, and volumes of horticulture designs. 1104 Read and interpret landscape design symbols and abbreviations. 1105 Transplant various types of plant material. 1106 Prune various types of plant material. 1107 Describe the characteristics of lawn/turfgrass installation and maintenance. 1108 Describe the characteristics and features of various types of growing structures. 1109 Prepare plant material for marketing or sales. 1110 Recognize non-traditional growth and propagation of various plant materials. (Examples may include but not limited to; hydroponics, aquaponics, aeroponics, and tissue culture.)	**Refer to the end of this document for an explanation of the following standards and sample indicators:** **COMMON CAREER TECHNICAL CORE STANDARDS:** **AGRICULTURE/FOOD AND NATIONAL RESOURCES CLUSTER** **AG-1** **PLANT SYSTEMS CAREER PATHWAY** **AG-PL2** **AG-PL3**	**KEY IDEAS/DETAILS** **GRADES 9-10** **Standard PCS.3.5.9-10.A** **Standard PCS.3.5.9-10.B** **Standard PCS.3.5.9-10.C** **GRADES 11-12** **Standard PCS.3.5.11-12A** **Standard PCS.3.5.11-12.B** **Standard PCS.3.5.11-12.C** **CRAFT AND STRUCTURE** **GRADES 9-10** **Standard PCS.3.5.9-10.D.** **Standard PCS.3.5.9-10.E** **Standard PCS.3.5.9-10.F** **GRADES 11-12** **Standard PCS.3.5.11-12.D** **Standard PCS.3.5.11-12.E** **Standard PCS.3.5.11-12.F** **INTEGRATE KNOWLEDGE/IDEAS** **GRADES 9-10** **Standard PCS.3.5.9-10.G** **Standard PCS.3.5.9-10.H** **Standard PCS.3.5.9-10.I** **GRADES 9-12**	**TEXT TYPES/ PURPOSE** **GRADES 9-10** **Standard PCS.3.6.9-10.A** **Standard PCS.3.6.9-10.B** **GRADES 11-12** **Standard PCS.3.6.11-12.A** **Standard PCS.3.6.11-12.B** **PRODUCTION AND DISTRIBUTION OF WRITING** **GRADES 9-10** **Standard PCS.3.6.9-10.C** **Standard PCS.3.6.9-10 D** **Standard PCS.3.6.9-10.E** **GRADES 11-12** **Standard PCS.3.6.11-12 C** **Standard.PCS.3.6.11-12.D** **Standard PCS.3.6.11- 12 E** **RESEARCH** **GRADES 9-10** **Standard PCS.3.6.9-10.F** **Standard PCS.3.6.9-10.G** **Standard PCS.3.6.9-10.H** **GRADES 11-12** **Standard PCS.3.6.11-12.F**	

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REFERENCE LIST FOR COMMON CAREER TECHNICAL CORE STANDARDS, AND SAMPLE INDICATORS RELATED TO THE AGRICULTURE, FOOD AND NATURAL RESOURCES CAREER CLUSTER

AG 1 Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster.

a. Describe the major impacts of AFNR legislation.
b. Describe the major regulations impacting the management of an individual resource.
c. Identify situations that violate regulations.
d. Identify significant issues that impact work assignment.
e. List the potential economic, environmental and social costs and benefits of enacting sustainability initiatives in AFNR.
f. Discuss the current applications of biotechnology in AFNR.
g. Explain how biotechnology is used in specific AFNR activities.

AG 2 Evaluate the nature and scope of the Agriculture, Food & Natural Resources Career Cluster and the role agriculture, food and natural resources (AFNR) play in society and the economy.

a. Examine the role and major functions of AFNR organizations to better utilize AFNR guidelines.
b. Explain the major guidelines used by AFNR organizations to manage and improve performance while maintaining ecosystem health.
c. Examine economic, social and technological changes to spotlight their impact on AFNR organizations and the industry.
d. Explain technological changes to reveal their impact on information technology and transportation.
e. State the economic output of AFNR-related industries in the United States.
f. Evaluate the impact of AFNR activities in your local community.
g. Explain the relationship between agriculture, food and natural resources.
h. Identify ways in which the average person interacts with AFNR on a daily basis.

AG 3 Examine and summarize importance of health, safety and environmental management systems in AFNR organizations.

a. Define what level of possible contamination or injury is considered a risk in order to set safety priorities.
b. 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.

c. Identify various emergency response plan requirements for a facility.
d. Develop an emergency response plan for natural disasters.
e. Identify general workplace safety hazards.
f. Apply general workplace safety precautions/procedures.
g. Acquire and maintain first aid certification.
h. Acquire and maintain cardiopulmonary resuscitation (CPR) certification.
i. Respond to medical emergencies.
j. Explain purpose of pollution control systems.
k. Describe procedures to comply with environmental regulations.
l. Maintain environmental health and safety facilities.
m. Handle chemicals and safety equipment appropriately.
n. Explain ergonomic procedures.
o. Assess workplace safety.
p. Assess a safety-training plan.
q. Observe all regulatory and safety standards.
r. Study appropriate resources to identify the major regulatory areas (e.g., personal protective equipment) and government laws and regulations.
s. Establish a set of safety, health and environmental principles to ensure a high level of performance.
t. Develop a pollution/waste prevention plan to reduce or eliminate waste.
u. Identify and describe common hazards in the workplace.
v. 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).
w. Identify sources of combustible/flammable materials, fire and emergencies to establish a fire-safe environment.
x. Interpret safety signs and symbols.
y. Identify procedures necessary for maintaining a safe work area.
z. Identify methods to correct common hazards.
aa. Identify methods for disposing of hazardous materials.
bb. Demonstrate principals of safe physical movement to avoid slips, trips and spills.
cc. Inspect and use protective equipment (PPE).

AG 4 Demonstrate stewardship of natural resources in AFNR activities.

a. Explain how personal choices are related to natural resource sustainability.
b. Describe strategies to help an organization create a culture of natural resource stewardship.
c. Predict the positive and negative impacts of given AFNR activities.

AG 5 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources Career Pathways.

a. Locate and interpret career information for at least one career cluster.
b. Identify job requirements for career pathways.
c. Identify educational and credentialing requirements for career cluster and pathways.
d. Identify personal interests and aptitudes.
e. Identify job requirements and characteristics of selected careers.

f. Compare personal interests and aptitudes with job requirements and characteristics of career selected.
g. Modify career goals based on results of personal interests and aptitudes with career requirements and characteristics.
h. List examples of careers that require various levels of postsecondary education in each AFNR pathway.
i. Explain the primary benefit of having a career in each of the AFNR pathways.

AG 6 Analyze the interaction among ANFR systems in the production, processing and management of food, fiber and fuel and sustainable use of natural resources.

a. None

COMMON CAREER TECHNICAL CORE STANDARDS, AND SAMPLE INDICATORS RELATED TO THE PLANT SYSTEMS CAREER PATHWAY

AG-PL 1 Develop and implement a crop management plan for a given production goal that accounts for environmental factors.

a. Describe nutrient sources.
b. Determine plant nutrient requirements for optimum growth.
c. Identify function of plant nutrients in plants.
d. Determine the environmental factors that influence and optimize plant growth.
e. Apply nutrients to plants for economic growth.
f. Describe nutrient application methods and appropriate practices.
g. Collect and test soil/media and/or plant tissue.
h. Interpret tests of soil/media and/or plant tissue.
i. Identify soil slope, structure and type.
j. Evaluate soil/media permeability and water-holding capacity.
k. Determine the chemical properties of soil/media.
l. Determine land use capability.
m. Determine the biological functions of microorganisms of soil/media.
n. Describe plant response to light color, intensity and duration.
o. Determine the optimal and allowable air and soil temperature and water conditions for plant growth.
p. Describe the optimal and allowable characteristics of the growing media for plant growth.
q. Explain how soil draining and water-holding capacity can be improved.
r. Design an irrigation schedule that makes the most efficient use of irrigation water.
s. Identify categories of soil water.
t. Explain the various types and components of growing media.
u. Describe techniques to reduce soil compaction.
v. 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.

a. Identify plant structures (e.g., seeds).
b. Describe physiological functions of plants.

c. Describe germination process and conditions.
d. Classify plants as monocots or "dicots."
e. Classify plants as annuals, biennials, or perennials.
f. Classify plants according to growth habit.
g. Classify plants by type.
h. Classify plants by economic value.
i. Classify plants by agricultural use.
j. List the scientific names and key characteristics of agriculturally important plants.
k. Identify root types, tissues and components.
l. Explain active and passive transport through root systems.
m. Identify the components of plant stems.
n. Explain translocation.
o. Explain how plant management techniques can impact mineral transport and translocation.
p. Identify the different types of flowers and flower forms.
q. Explain how flower structures impact plant breeding and production.
r. Describe the types and components of seeds and fruits.
s. Explain how plants are managed for the production of seeds and fruit.
t. Explain how plant management relies on understanding of light-dependent and light-independent reactions of photosynthesis.
u. Relate plant growth, management and harvesting strategies in response to stages of cellular respiration in plants.
v. 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.

a. Identify and select seeds and plants.
b. Manipulate and evaluate environmental conditions (e.g., irrigation, mulch, shading) to foster plant germination, growth and development.
c. Evaluate and demonstrate planting practices (e.g., population rate, germination/seed vigor, inoculation, seed and plant treatments).
d. Evaluate and demonstrate transplanting practices.
e. Prepare soil/media for planting.
f. Control plant growth (e.g., pruning, pinching, disbudding, topping, de-tasseling, staking, cabling, shearing, shaping).
g. Prepare plants and plant products for distribution.
h. Determine crop maturity.
i. Identify harvesting practices and equipment.
j. Demonstrate common harvesting techniques.
k. Calculate yield and loss.
l. Identify options for crop storage.
m. Maintain quality of plant products in storage.
n. Prepare plants and plant products for distribution.
o. Demonstrate techniques for grading, handling and packaging plants and plant products for distribution.
p. Predict typical loss of plants or plant products in the process of handling, packaging and/or distribution.
q. Identify methods for storing plants and plant products.
r. Explain how cellular respiration affects plant and plant product storage.

s. Explain the proper conditions for storage of plants and plant products.
t. Inspect propagation material for pests and diseases.
u. Prepare growing media/soil for planting.
v. Prepare a schedule for production that accommodates environmental setting (natural, greenhouse, or modified).
w. Demonstrate proper plant procedures and post-planting care.
x. Control growth through mechanical, cultural, or mechanical means.
y. Identify major weeds, beneficial insects, insect pests and plant diseases for region and crop.
z. Diagram the life cycles of major plant pests and diseases.
aa. Explain the proper selection and use of pesticide controls and formulations.
bb. Compare the risks and benefits of chemical and non-chemical pest controls.
cc. Explain pollination, cross-pollination and self-pollination of flowering plants.
dd. Design plans to control the pollination of flowering plants.
ee. Demonstrate seed-sowing techniques that result in favorable germination, viability and vigor.
ff. Demonstrate proper procedures in budding or grafting plant materials.
gg. Propagate plants by micro-propagation.
hh. Explain the principles and processes of recombinant DNA technology in plants.
ii. Compare plant breeding and genetic modification.
jj. Calculate the economic, environmental and human health costs and benefits of incorporating sustainable plant production practices.
kk. Plan the production of plants or plant products that incorporate sustainable practices.
ll. Identify the certifying options for crops and plants produced using sustainable techniques.
mm. Explain the principles and processes of recombinant DNA technology in plants.
nn. 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).

a. Conduct a site evaluation for physical condition and design implications.
b. Apply elements of design (e.g., line, form, texture, color).
c. Incorporate principles of design (e.g., space, scale, proportion, order).
d. Use landscape design drawing tools including Computer Aided Design (CAD) and industry specific software.
e. Select hard goods, supplies and tools used in design.
f. Select plant(s) for design.