Oklahoma CTE

# Introduction to Plant and Soil Science (2014)

Adopted 2014

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| **World Agronomy** | **a.** Explain systems used to classify plants. PS.01.01.01.A |
| | **b.** Compare and contrast the hierarchical classification of agricultural plants. PS.01.01.01.B |
| | **b.** Identify agriculturally important plants by common names. PS.01.01.02.B |
| | **c.** Identify agriculturally important plants by scientific names. PS.01.01.02.C |
| **Plant Structures and Functions** | **a.** Describe the morphological characteristics used to identify agricultural plants. PS.01.01.02.A |
| | **a.** Diagram a typical plant cell and identify plant cell organelles and their functions. PS.01.02.01.A |
| | **a.** Identify the components, the types and the functions of plant roots. PS.01.02.02.A |
| | **a.** Identify the components and the functions of plant stems. PS.01.02.03.A |
| | **a.** Discuss leaf morphology and the functions of leaves. PS.01.02.04.A |
| | **a.** Identify the components of a flower, the functions of a flower and the functions of flower components. PS.01.02.05.A |
| | **b.** Identify the different types of flowers and flower forms. PS.01.02.05.B |
| | **a.** Explain the functions and components of seeds and fruit. PS.01.02.06.A |
| | **a.** Explain the basic process of photosynthesis and its importance to life on Earth. PS.01.03.01.A |
| | **b.** Explain requirements necessary for photosynthesis to occur and identify the products and byproducts of photosynthesis. PS.01.03.01.B |
| | **a.** Explain cellular respiration and its importance to plant life. PS.01.03.02.A |

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| | **b.** Explain factors that affect cellular respiration and identify the products and byproducts of cellular respiration. PS.01.03.02.B |
| | **b.** Identify the plant responses to plant growth regulators and different forms of tropism. PS.01.03.04.B |
| | **a.** Describe the effects air, temperature and water have on plant metabolism and growth. PS.02.01.02.A |
| | **a.** Explain pollination, cross-pollination and self-pollination of flowering plants. PS.03.01.01.A |
| **Soil Formation and Use** | **a.** Explain the process of soil formation through weathering. ESS.03.02.01.A |
| | **a.** Explain how the physical qualities of the soil influence the infiltration and percolation of water. ESS.03.02.03.A |
| | **a.** Demonstrate techniques used to identify rock, mineral and soil types. NRS.01.02.05.A |
| | **b.** Identify rock, mineral and soil types. NRS.01.02.05.B |
| | **a.** Identify the categories of soil water. PS.02.02.02.A |
| | **b.** Discuss how soil drainage and waterholding capacity can be improved. PS.02.02.02.B |
| | **a.** Discuss the influence of pH and cation exchange capacity on the availability of nutrients. PS.02.03.02.A |
| **Plant Nutrition and Soil Fertility** | **a.** Identify biogeochemical cycles. NRS.02.06.01.A |
| | **b.** Diagram biogeochemical cycles and explain the processes. NRS.02.06.01.B |
| | **a.** Identify the operational components of a pumping or fluid movement system. ESS.03.03.06.A |
| | **a.** Identify the essential nutrients for plant growth and development and their major functions. PS.02.03.01.A |
| | **b.** Describe nutrient deficiency symptoms and recognize environmental causes of nutrient deficiencies. PS.02.03.01.B |
| | **a.** Discuss the influence of pH and cation exchange capacity on the availability of nutrients. PS.02.03.02.A |
| | **a.** Identify fertilizer sources of essential plant nutrients, explain fertilizer formulations, and describe different methods of fertilizer application. PS.02.03.04.A |

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| | **a.** Collect soil and plant tissue samples for testing and interpret the test results. PS.02.03.03.A |
| | **b.** Calculate the amount of fertilizer to be applied and calibrate equipment to apply the prescribed amount of fertilizer. PS.02.03.04.B |
| **Tillage and Conservation** | **b.** Discuss how soil drainage and waterholding capacity can be improved. PS.02.02.02.B |
| | **a.** Demonstrate sowing techniques and provide favorable conditions for seed germination. PS.03.01.02.A |
| **Crop Improvement** | **a.** Describe the selective plant breeding process. BS.03.03.01.A |
| | **a.** Identify the five groups of naturally occurring plant hormones and synthetic plant growth regulators. PS.01.03.04.A |
| | **a.** Explain pollination, cross-pollination and self-pollination of flowering plants. PS.03.01.01.A |
| | **a.** Explain the principles behind recombinant DNA technology and the basic steps in the process. PS.03.01.05.A |
| | **b.** Give examples of the risks and advantages associated with genetically modified plants. PS.03.01.05.B |
| **Seeding and Planting Practices** | **b.** Handle seed to overcome seed dormancy mechanisms and to maintain seed viability and vigor. PS.03.01.02.B |
| | **a.** Explain the importance of starting with pest- and disease-free propagation material. PS.03.02.01.A |
| | **a.** Explain the reasons for preparing growing media before planting. PS.03.02.02.A |
| | **a.** Demonstrate proper planting procedures and post-planting care. PS.03.02.03.A |
| | **a.** Identify types of plant pests and disorders. PS.03.03.01.A |
| **Pest Management** | **a.** Use proper safety practices/personal protective equipment. CS.06.02.01.A |
| | **a.** Identify types of plant pests and disorders. PS.03.03.01.A |
| | **b.** Identify major local weeds, insect pests and infectious and noninfectious plant diseases. PS.03.03.01.B |
| | **a.** Describe damage caused by plant pests and diseases. PS.03.03.02.A |
| | **b.** Diagram the life cycles of major plant pests and diseases. PS.03.03.02.B |

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| | **a.** Describe pest control strategies associated with integrated pest management. PS.03.03.03.A |
| | **b.** Describe types of pesticide controls and formulations. PS.03.03.03.B |
| | **a.** Explain risks and benefits associated with the materials and methods used in plant pest management. PS.03.03.04.A |
| | **b.** Explain procedures for the safe handling, use and storage of pesticides. PS.03.03.04.B |
| **Harvesting and Marketing** | **a.** Identify and use strategies frequently employed in marketing programs, including those used in niche markets. ABS.06.03.01.A |
| | **a.** Identify harvesting methods and harvesting equipment. PS.03.05.01.A |
| | **b.** Assess the stage of growth to determine crop maturity or salability and demonstrate proper harvesting techniques. PS.03.05.01.B |
| | **a.** Identify storage methods for plants and plant products. PS.03.05.03.A |
| | **b.** Explain the proper conditions to maintain the quality of plants and plant products held in storage. PS.03.05.03.B |
| | **a.** Explain the reasons for preparing plants and plant products for distribution. PS.03.05.04.A |
| | **b.** Demonstrate techniques for grading, handling and packaging plants and plant products for distribution. PS.03.05.04.B |
| **Sustainable Agriculture** | **a.** Explain sustainable agriculture and objectives associated with the strategy. PS.03.04.01.A |
| | **b.** Describe sustainable agriculture practices and compare the ecological effects of traditional agricultural practices with those of sustainable agriculture. PS.03.04.01.B |