

# Introduction to Plant and Soil Science (2014)

Adopted 2014

## World Agronomy

- a. Explain systems used to classify plants. PS.01.01.01.A

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- b. Compare and contrast the hierarchical classification of agricultural plants. PS.01.01.01.B

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- b. Identify agriculturally important plants by common names. PS.01.01.02.B

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- 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

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- a. Diagram a typical plant cell and identify plant cell organelles and their functions. PS.01.02.01.A

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- a. Identify the components, the types and the functions of plant roots. PS.01.02.02.A

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- a. Identify the components and the functions of plant stems. PS.01.02.03.A

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- a. Discuss leaf morphology and the functions of leaves. PS.01.02.04.A

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- a. Identify the components of a flower, the functions of a flower and the functions of flower components. PS.01.02.05.A

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- b. Identify the different types of flowers and flower forms. PS.01.02.05.B

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- a. Explain the functions and components of seeds and fruit. PS.01.02.06.A

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- a. Explain the basic process of photosynthesis and its importance to life on Earth. PS.01.03.01.A

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- b. Explain requirements necessary for photosynthesis to occur and identify the products and byproducts of photosynthesis. PS.01.03.01.B

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- 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

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**b. Identify the plant responses to plant growth regulators and different forms of tropism.** PS.01.03.04.B

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**a. Describe the effects air, temperature and water have on plant metabolism and growth.** PS.02.01.02.A

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**a. Explain pollination, cross-pollination and self-pollination of flowering plants.** PS.03.01.01.A

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## Soil Formation and Use

**a. Explain the process of soil formation through weathering.** ESS.03.02.01.A

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**a. Explain how the physical qualities of the soil influence the infiltration and percolation of water.** ESS.03.02.03.A

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**a. Demonstrate techniques used to identify rock, mineral and soil types.** NRS.01.02.05.A

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**b. Identify rock, mineral and soil types.** NRS.01.02.05.B

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**a. Identify the categories of soil water.** PS.02.02.02.A

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**b. Discuss how soil drainage and waterholding capacity can be improved.** PS.02.02.02.B

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**a. Discuss the influence of pH and cation exchange capacity on the availability of nutrients.** PS.02.03.02.A

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## Plant Nutrition and Soil Fertility

**a. Identify biogeochemical cycles.** NRS.02.06.01.A

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**b. Diagram biogeochemical cycles and explain the processes.** NRS.02.06.01.B

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**a. Identify the operational components of a pumping or fluid movement system.** ESS.03.03.06.A

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**a. Identify the essential nutrients for plant growth and development and their major functions.** PS.02.03.01.A

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**b. Describe nutrient deficiency symptoms and recognize environmental causes of nutrient deficiencies.** PS.02.03.01.B

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**a. Discuss the influence of pH and cation exchange capacity on the availability of nutrients.** PS.02.03.02.A

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**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

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**b. Calculate the amount of fertilizer to be applied and calibrate equipment to apply the prescribed amount of fertilizer.** PS.02.03.04.B

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## Tillage and Conservation

**b. Discuss how soil drainage and waterholding capacity can be improved.** PS.02.02.02.B

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**a. Demonstrate sowing techniques and provide favorable conditions for seed germination.** PS.03.01.02.A

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## Crop Improvement

**a. Describe the selective plant breeding process.** BS.03.03.01.A

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**a. Identify the five groups of naturally occurring plant hormones and synthetic plant growth regulators.** PS.01.03.04.A

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**a. Explain pollination, cross-pollination and self-pollination of flowering plants.** PS.03.01.01.A

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**a. Explain the principles behind recombinant DNA technology and the basic steps in the process.** PS.03.01.05.A

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**b. Give examples of the risks and advantages associated with genetically modified plants.** PS.03.01.05.B

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## Seeding and Planting Practices

**b. Handle seed to overcome seed dormancy mechanisms and to maintain seed viability and vigor.** PS.03.01.02.B

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**a. Explain the importance of starting with pest- and disease-free propagation material.** PS.03.02.01.A

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**a. Explain the reasons for preparing growing media before planting.** PS.03.02.02.A

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**a. Demonstrate proper planting procedures and post-planting care.** PS.03.02.03.A

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**a. Identify types of plant pests and disorders.** PS.03.03.01.A

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## Pest Management

**a. Use proper safety practices/personal protective equipment.** CS.06.02.01.A

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**a. Identify types of plant pests and disorders.** PS.03.03.01.A

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**b. Identify major local weeds, insect pests and infectious and noninfectious plant diseases.** PS.03.03.01.B

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**a. Describe damage caused by plant pests and diseases.** PS.03.03.02.A

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**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

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**b. Describe types of pesticide controls and formulations.** PS.03.03.03.B

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**a. Explain risks and benefits associated with the materials and methods used in plant pest management.** PS.03.03.04.A

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**b. Explain procedures for the safe handling, use and storage of pesticides.** PS.03.03.04.B

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## Harvesting and Marketing

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**a. Identify and use strategies frequently employed in marketing programs, including those used in niche markets.** ABS.06.03.01.A

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**a. Identify harvesting methods and harvesting equipment.** PS.03.05.01.A

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**b. Assess the stage of growth to determine crop maturity or salability and demonstrate proper harvesting techniques.** PS.03.05.01.B

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**a. Identify storage methods for plants and plant products.** PS.03.05.03.A

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**b. Explain the proper conditions to maintain the quality of plants and plant products held in storage.** PS.03.05.03.B

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**a. Explain the reasons for preparing plants and plant products for distribution.** PS.03.05.04.A

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**b. Demonstrate techniques for grading, handling and packaging plants and plant products for distribution.** PS.03.05.04.B

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## Sustainable Agriculture

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**a. Explain sustainable agriculture and objectives associated with the strategy.** PS.03.04.01.A

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**b. Describe sustainable agriculture practices and compare the ecological effects of traditional agricultural practices with those of sustainable agriculture.** PS.03.04.01.B