Introduction to Plant and Soil Science
Curriculum Crosswalk
National Agriculture, Food and Natural Resources (AFNR) Career Cluster Content Standards

Unit 1
World Agronomy
PS.01.01.01.a. — Explain systems used to classify plants.
PS.01.01.01.b. — Compare and contrast the hierarchical classification of agricultural plants.
PS.01.01.02.b. — Identify agriculturally important plants by common names.
PS.01.01.02.c. — Identify agriculturally important plants by scientific names.

Unit 2
Plant Structures and Functions
PS.01.02.01.a. — Diagram a typical plant cell and identify plant cell organelles and their functions.
PS.01.02.02.a. — Identify the components, the types and the functions of plant roots.
PS.01.02.03.a. — Identify the components and the functions of plant stems.
PS.01.02.04.a. — Discuss leaf morphology and the functions of leaves.
PS.01.02.05.a. — Identify the components of a flower, the functions of a flower and the functions of flower components.
PS.01.02.05.b. — Identify the different types of flowers and flower forms.
PS.01.02.06.a. — Explain the functions and components of seeds and fruit.
PS.01.03.01.a. — Explain the basic process of photosynthesis and its importance to life on Earth.
PS.01.03.01.b. — Explain requirements necessary for photosynthesis to occur and identify the products and byproducts of photosynthesis.
PS.01.03.02.a. — Explain cellular respiration and its importance to plant life.
PS.01.03.02.b. — Explain factors that affect cellular respiration and identify the products and byproducts of cellular respiration.
PS.01.03.04.b. — Identify the plant responses to plant growth regulators and different forms of tropism.
PS.02.01.02.a. — Describe the effects air, temperature and water have on plant metabolism and growth.
PS.03.01.01.a. — Explain pollination, cross-pollination and self-pollination of flowering plants.

Unit 3
Soil Formation and Use
ESS.03.02.01.a. — Explain the process of soil formation through weathering.
ESS.03.02.03.a. — Explain how the physical qualities of the soil influence the infiltration and percolation of water.
NRS.01.02.05.a. — Demonstrate techniques used to identify rock, mineral and soil types.
NRS.01.02.05.b. — Identify rock, mineral and soil types.
PS.02.02.02.a. — Identify the categories of soil water.
PS.02.02.02.b. — Discuss how soil drainage and water-holding capacity can be improved.
PS.02.03.02.a. — Discuss the influence of pH and cation exchange capacity on the availability of nutrients.

Unit 4
Plant Nutrition and Soil Fertility
NRS.02.06.01.a. — Identify biogeochemical cycles.
NRS.02.06.01.b. — Diagram biogeochemical cycles and explain the processes.
ESS.03.03.06.a. — Identify the operational components of a pumping or fluid movement system.
PS.02.03.01.a. — Identify the essential nutrients for plant growth and development and their major functions.
PS.02.03.01.b. — Describe nutrient deficiency symptoms and recognize environmental causes of nutrient deficiencies.
PS.02.03.02.a. — Discuss the influence of pH and cation exchange capacity on the availability of nutrients.
PS.02.03.04.a. — Identify fertilizer sources of essential plant nutrients, explain fertilizer formulations, and describe different methods of fertilizer application.
PS.02.03.03.a. — Collect soil and plant tissue samples for testing and interpret the test results.
PS.02.03.04.b. — Calculate the amount of fertilizer to be applied and calibrate equipment to apply the prescribed amount of fertilizer.
**Unit 5**

**Tillage and Conservation**

PS.02.02.02.b. — Discuss how soil drainage and water-holding capacity can be improved.

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

**Unit 6**

**Crop Improvement**

BS.03.01.01.a. — Describe the selective plant breeding process.

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

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

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

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

**Unit 7**

**Seeding and Planting Practices**

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

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

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

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

PS.03.03.01.a. — Identify types of plant pests and disorders.

**Unit 8**

**Pest Management**

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

PS.03.03.01.a. — Identify types of plant pests and disorders.

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

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

PS.03.03.02.b. — Diagram the life cycles of major plant pests and diseases.

PS.03.03.03.a. — Describe pest control strategies associated with integrated pest management.

PS.03.03.03.b. — Describe types of pesticide controls and formulations.

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

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

**Unit 9**

**Harvesting and Marketing**

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

PS.03.05.01.a. — Identify harvesting methods and harvesting equipment.

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

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

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

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

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

**Unit 10**

**Sustainable Agriculture**

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

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

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