Ohio CTE: Agricultural and Environmental Systems

Plant Science

Plant Nutrition: Select and apply macronutrients and micronutrients based on deficiencies identified from the use of industry-driven testing, application, methods, and optimum management strategies that account for environmental factors. 8.1	1 **Compare and contrast organic and inorganic sources of macronutrients and micronutrients.** 8.1.1
	2 **Describe the functions of macronutrients and micronutrients in plants and the role that microorganisms play in plant nutrition.** 8.1.2
	3 **Identify and describe the nutrient recommendations of a plant for a desired production setting.** 8.1.3
	4 **Identify symptoms and causes of plant nutrient deficiencies and toxicities.** 8.1.4
	5 **Collect soil and plant tissue for testing and analysis using standard industry practice.** 8.1.5
	6 **Analyze and draw conclusions from soil and plant tissue test data and determine management recommendations for increased production, increased profitability, enhanced environmental protection, and improved suitability.** 8.1.6
	7 **Distinguish between biotic and abiotic factors (e.g., soil type, minerals, pH, microorganisms) that influence and optimize the availability of nutrients for plants.** 8.1.7
	8 **Calculate nutrient requirements and select nutrient sources and additives for the highest potential yield.** 8.1.8
	9 **Calculate nutrient requirements and select nutrient sources and additives for the highest return on investment.** 8.1.9
	10 **Determine the nutrient content of organic and inorganic fertilizers.** 8.1.10
	11 **Select the methods and time of nutrient application and apply nutrients.** 8.1.11
	12 **Describe and apply the five 5 R's of nutrient management: (1) right source of fertilizer at the (2) right rate at the (3) right time in the (4) right place with the (5) right irrigation method.** 8.1.12
Plant Reproduction: Propagate plants and cultivars for specific performance characteristics under a	1 **Identify the reproductive anatomy of plants and describe their physiological functions.** 8.2.1
	2 **Describe how biotic and abiotic factors (e.g., insects, light, temperature, microorganisms, moisture, location) influence plant reproduction.** 8.2.2

variety of production systems. 8.2	3 Compare and contrast variations of plant reproductive systems among plant species. 8.2.3
	4 Describe how artificial selection methods are used in plant breeding to improve plant traits. 8.2.4
	5 Select and apply methods of asexual plant propagation. 8.2.5
Pest Management: Develop and implement an integrated pest management (IPM) plan by scouting and identifying specific plant pests and the damage they cause and apply specialized control methods. 8.3	1 Identify and classify insects, weeds, pathogens, animal pests, and describe the damage they cause. 8.3.1
	2 Examine the interrelationships of the disease triangle among host, pathogen, and environment. 8.3.2
	3 Analyze and calculate the economic threshold of pest damage. 8.3.3
	4 Determine the components of an integrated pest management plan and related safety practices. 8.3.4
	5 Describe native and transgenic adaptations and modifications that have led to plant tolerance or resistance to fungal, bacteria, and insect pests. 8.3.5
	6 Describe the types and functions of biological, mechanical, and chemical control methods. 8.3.6
	7 Develop an IPM plan, based on pest life cycles, available treatments, application methods, and evaluate its impact on the environment (e.g. drift, application rate and long-term soil health). 8.3.7
Growth and Management: Explain, manage, and manipulate plants through all stages of growth and development. 8.4	1 Identify and classify plants using taxonomy. 8.4.1
	2 Identify plant anatomical structures and their functions. 8.4.2
	3 Identify and classify seeds. 8.4.3
	4 Identify and classify plants and describe management decisions at all stages. 8.4.4
	5 Explain the requirements of photosynthesis and identify the products and byproducts. 8.4.5
	6 Explain the process and importance of transpiration in plant growth and development. 8.4.6
	7 Understand aerobic respiration and its relationship to plant growth and management. 8.4.7
	8 Explain primary and secondary plant growth. 8.4.8

	9 Identify plant responses to plant growth regulators and different forms of tropism. 8.4.9
	10 Understand the environmental and artificial factors that influence plant germination, growth, and development. 8.4.10
	11 Select, evaluate, and prepare soil or media for planting. 8.4.11
	12 Understand and evaluate the process by which plants are selected in relation to production use. 8.4.12
	13 Evaluate and implement planting practices. 8.4.13
	14 Describe factors related to seed quality, treatment, and density that affect emergence, stand uniformity, and seedling health. 8.4.14
	15 Evaluate and implement transplanting practices. 8.4.15
	16 Control plant growth through mechanical and chemical means. 8.4.16
	17 Analyze plant water requirements and describe methods of irrigation. 8.4.17
	18 Compare and contrast inorganic and organic production practices. 8.4.18
	19 Identify and describe production practices that lead to plant resistance and tolerance. 8.4.19
	20 Compare and contrast management practices in controlled and natural growing environments. 8.4.20
	21 Distinguish between biotic and abiotic factors that influence plant stress. 8.4.21
Harvesting: Describe and implement harvesting methods. 8.5	1 Determine crop readiness for salability and environmental conditions that can impact crop quality at harvest. 8.5.1
	2 Describe safety precautions to take when harvesting. 8.5.2
	3 Evaluate techniques to maximize yield through mechanical or hand harvesting methods. 8.5.3
	4 Calculate and evaluate potential yield and loss due to harvesting. 8.5.4
	5 Evaluate the impact of harvest techniques on the quality of plants and plant products. 8.5.5
	6 Identify and implement harvesting methods and equipment. 8.5.6
	7 Implement management practices to reduce loss. 8.5.7

Handling Storage: Handle and store plants and plant products to maximize quality and longevity. 8.6

1. **Describe safety precautions in handling and storage practices.** 8.6.1
2. **Explain, monitor, and manipulate conditions for optimal handling and storage of plants and plant products.** 8.6.2
3. **Calculate potential yield and loss due to processing and storage.** 8.6.3
4. **Prepare products for sale, transportation, and storage.** 8.6.4
5. **Identify storage methods and storage capacity for plants and plant products.** 8.6.5
6. **Explain the reasons for preparing plants and plant products for distribution.** 8.6.6
7. **Implement and evaluate techniques for grading, handling, blending, segregating, packaging, and loading plants and plant products for distribution or transportation.** 8.6.7