

# MICHIGAN TEST FOR TEACHER CERTIFICATION (MTTC)

## TEST OBJECTIVES FIELD 037: AGRICULTURAL EDUCATION

Subarea	Approximate Percentage of Questions on Test
Animal Science	22%
Plant and Soil Science	20%
Horticulture	22%
Agricultural Business and Management	20%
Agricultural Resources and Careers	16%

### I. ANIMAL SCIENCE

**001 Understand biological aspects of swine production.**

Includes breeds of swine and their characteristics, anatomy, physiology, nutritional requirements, diseases, and parasites.

**002 Understand biological aspects of beef and dairy cattle production.**

Includes breeds of beef and dairy cattle and their characteristics, anatomy, physiology, nutritional requirements, diseases, and parasites.

**003 Understand biological aspects of horse production.**

Includes breeds of horses and their characteristics, anatomy, physiology, nutritional requirements, diseases, and parasites.

**004 Apply principles of nutrition to livestock.**

Includes types and characteristics of livestock feed; the purposes and characteristics of feed additives; the selection of appropriate feed and feeding schedules; and the effects of various feeds on animals and animal products.

**005 Apply procedures to control the diseases and parasites of livestock.**

Includes the symptoms of diseases; parasites and parasitic infestations affecting livestock; and methods of prevention and treatment, including legal restrictions.

**006 Understand animal reproduction and breeding practices.**

Includes factors involved in selecting breeding stock; the principles of genetics in breeding; and procedures related to breeding animals and parturition.

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**TEST OBJECTIVES**  
**FIELD 037: AGRICULTURAL EDUCATION**

**007 Understand livestock evaluation.**

Includes criteria for evaluating livestock, live animals, and carcasses; and procedures for judging livestock.

**008 Analyze methods of controlling the environment of livestock.**

Includes the effect of the environment on livestock; appropriate facilities for raising and handling livestock; equipment and procedures for regulating temperature and humidity; and maintenance of sanitary conditions and waste management.

**009 Understand livestock and poultry product processing.**

Includes types of livestock and poultry products; wholesale and retail cuts; types and quality of product packaging; and the principles of quality control.

**II. PLANT AND SOIL SCIENCE**

**010 Analyze the processes of plant growth and reproduction.**

Includes plant nutrition and growth, including use of fertilizer; and the processes of photosynthesis, respiration, transpiration, and sexual and asexual reproduction in plants.

**011 Identify the characteristics and uses of field crops.**

Includes types and characteristics of field crops; crop varieties; market grades of crops; and major uses of field crops.

**012 Analyze methods of preparing seedbeds and planting field crops.**

Includes the uses and characteristics of various types of seedbed preparation and planting equipment; types of tillage systems and planting methods and their characteristics; and the selection of appropriate seedbed preparations, planting methods, and crop rotations in various situations.

**013 Analyze methods of harvesting field crops.**

Includes the uses and characteristics of various types of harvesting equipment; and the selection of harvesting methods in various situations.

**014 Identify types of plant pests (e.g., insects, diseases, and weeds) and ways of controlling them.**

Includes types and characteristics of plant pests; methods for the control of plant pests; and proper use, storage, and disposal of pesticides.

**TEST OBJECTIVES**  
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**015 Identify types of soil and their composition.**

Includes characteristics, classifications, and components of soil; biological, chemical, physical, and other factors affecting soil; and soil maps.

**016 Understand drainage and irrigation.**

Includes various drainage and irrigation methods and their characteristics and selection.

**017 Apply soil-testing methods.**

Includes procedures for taking soil samples; methods of soil testing and their characteristics; and soil-test reports.

**018 Apply the principles of soil conservation.**

Includes types and characteristics of soil erosion; methods of soil and water conservation; and topographic and land capability maps.

**019 Understand crop product processing.**

Includes types of crop products; wholesale and retail crops; types and quality of product packaging; and the principles of quality control.

**III. HORTICULTURE**

**020 Identify horticultural plants and their uses.**

Includes the classification of different types of horticultural plants; and characteristics and appropriate uses of various horticultural plants.

**021 Analyze the characteristics of horticultural growing media.**

Includes types of horticultural growing media and their characteristics, components, and selection; and methods of mixing media and improving soil fertility.

**022 Analyze the growth requirements of horticultural plants.**

Includes light, water, pH, nutrient, soil, and other special requirements of plants.

**023 Apply procedures for planting, transplanting, propagating, maintaining, and harvesting horticultural plants.**

Includes procedures for planting, transplanting, propagating, maintaining, and harvesting plants.

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**024 Identify types of horticultural plant pests (e.g., insects, diseases, and weeds) and ways of controlling them.**

Includes types and characteristics of pests and plant diseases affecting horticultural plants; methods for their control; and the proper use, storage, and disposal of pesticides.

**025 Understand the production of nursery plants.**

Includes types of equipment and their uses in nurseries; types of plants and other products produced in nurseries; environmental factors affecting nursery production; and procedures for maintaining and improving nursery production.

**026 Understand the production of greenhouse plants.**

Includes types of equipment and their uses in greenhouses; types of plants and other products produced in greenhouses; and the facilities, design, and methods for controlling the greenhouse environment.

**027 Understand the principles of floral design.**

Includes types of plant materials, design materials, and basic designs.

**028 Understand the principles of landscaping.**

Includes design, planting, and maintenance techniques.

**029 Understand the principles of turf management.**

Includes types and uses of turf; turf production methods; and turf maintenance procedures.

**IV. AGRICULTURAL BUSINESS AND MANAGEMENT**

**030 Apply principles of economics in agricultural business.**

Includes the principles of supply and demand; factors affecting market prices of agricultural products; the principles of economics involving production costs, labor, income, and profit; and the principles of competition in agricultural economics.

**031 Understand the use of credit in agriculture.**

Includes types and sources of credit and their characteristics; the total cost of credit agreements; and the causes and effects of changes in interest rates.

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**032 Apply business recordkeeping procedures.**

Includes types of business records and their characteristics, including computerized systems; records required for employees; records required for taxes, and their uses; and the use of appropriate accounting procedures.

**033 Analyze the role of the government in agriculture.**

Includes the reasons for and effects of government subsidies; the influence of domestic and foreign demand on agricultural production; the role of the government in farm, land, and forestry management; and the historical basis of current problems in agriculture.

**034 Analyze financial practices in agriculture.**

Includes types of taxes and insurance and their effective costs in agriculture; and the causes and effects of financial problems in agriculture.

**035 Apply procedures for scheduling and planning agricultural operations.**

Includes factors involved in arranging employee work schedules; product and market planning; budgeting procedures; and business plans for various types of agricultural operations.

**036 Understand business ownership.**

Includes forms of business ownership and their characteristics and responsibilities; the advantages and disadvantages of incorporating a business; and types of agricultural businesses and their characteristics.

**037 Identify methods of marketing agricultural products and services.**

Includes types and characteristics of agricultural markets and marketing and distribution channels; regulations related to agricultural marketing; marketing strategies; and the influence of futures in agricultural marketing.

**038 Apply the principles of marketing to agribusiness.**

Includes types, uses, and costs of advertising; the principles of public relations in agribusiness; ways to establish and maintain good customer relations; and the principles of selling.

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**V. AGRICULTURAL RESOURCES AND CAREERS**

**039 Apply the principles of conservation.**

Includes methods of conserving plants, forests, and wildlife and their habitats; and practices to promote soil conservation and water and air quality.

**040 Understand forestry.**

Includes types of trees and their characteristics; types of lumber and other products produced in forestry; procedures for estimating, measuring, and producing forestry products; and environmental factors that affect forestry production.

**041 Understand ecology.**

Includes the components, plant succession, climax vegetation, cycle of elements, and energy flow in an ecosystem; and the importance of ecological awareness in agricultural resource management.

**042 Understand land-use issues.**

Includes different types of land-use in the United States; processes involving the loss of farm land to nonfarm uses; and issues involved in increasing productive land.

**043 Identify the characteristics and functions of vocational student organizations (e.g., FFA).**

Includes the purposes of the organizations; the role and responsibilities of the advisor; and organizational activities.

**044 Identify the characteristics and functions of supervised agriscience and natural resource experience programs.**

Includes types of supervised student experience programs; and program records and their characteristics.

**045 Identify career opportunities and requirements in agriculture.**

Includes career areas, opportunities, job titles, and prerequisites for career areas in agriculture; and procedures for securing and maintaining employment in agriculture.