

Agriscience I

A Model Course Guideline

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Foreword

Agriscience I Curricular Guidelines is a model designed to assist in developing a rigorous and relevant course of study for Agriscience I, a course approved in the Secondary Science Program of Study (*Bulletin 741: Louisiana Handbook for School Administrators*, 1997-98, pages 107-108). The model includes a brief outline and more detailed course guidelines that embrace the core content essential skills and understandings embodied in the Louisiana Science Framework (May, 1997). It also presents a discussion of standards-based curriculum, the use of technology, inquiry-based science, laboratory safety, assessment, and the concept of rigorous and relevant learning for *all students*.

The intended audience for this publication includes science teachers, science chairpersons, supervisors of science, local curriculum developers, and school administrators who are involved in secondary science curriculum development and committed to high quality science education.

Agriscience I

Course Description

Agriscience I provides students with basic knowledge of agriculture and the applications of science in agriculture. Studies include laboratory units in animal science, soil science, plant science, agricultural mechanics, food science technology, and agricultural leadership.

*One elective credit in science may be awarded for completing both Agriscience I and Agriscience II.

CONTENT OUTLINE

- I. Introduction to Agriculture
 - A. Orientation to the Agriculture Program
 - B. Career Opportunities in the Agriculture Industry
 - C. The Supervised Agricultural Experience Program
 - D. Introduction to Agriculture Portfolio Development
 - E. Classroom Lab Safety
 - F. Problem Solving

- II. Agricultural Leadership
 - A. Introduction to the National FFA Organization
 - B. Personal Development Through FFA Opportunities
 - C. Development of Interpersonal Skills

- III. Animal Science
 - A. Animal Anatomy and Physiology
 - B. Animal Selection Based on Physiology and Genetics
 - C. Diseases and Parasites

- IV. Soil Science
 - A. Soil Formation
 - B. Soil Properties
 - C. Soil pH/Fertilization

- V. Energy Conservation
 - A. Energy Usage in Agriculture
 - B. Sources of Energy

VI. Plant Science

- A. Plant Growth
- B. Plant Environments
- C. Cultural Practices for Plants

VII. Food Science

- A. History and Trends of Food Processing
- B. Chemical and Biological Food Deterioration
- C. Food Processing Methods

VIII. Agricultural Mechanics

- A. Introduction/Shop Safety
- B. Woodworking/Construction
- C. Electricity

Model Curriculum Guidelines

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TOPICS	BENCHMARKS
<p>I. Introduction to Agriculture</p> <p>A. Orientation to the Agriculture Program</p> <ol style="list-style-type: none"> 1. Recognize the relationships between the three parts of the agriculture program 2. Describe the principle duties of the student, the parents, and the teacher for completion of each part <p>B. Career Opportunities in the Agriculture Industry</p> <ol style="list-style-type: none"> 1. Describe the scope of the agriculture industry 2. Discuss the economic impact of agriculture in Louisiana 3. Determine the relationship between agribusiness and production agriculture 4. Relate personal interests to career choices <p>C. The Supervised Agricultural Experience (SAE) Program</p> <ol style="list-style-type: none"> 1. Define the purpose and benefit of the SAE 2. Identify career areas of personal interest 3. Develop personalized SAE plans <p>D. Introduction to Agriculture Portfolio Development</p> <ol style="list-style-type: none"> 1. Determine the components of a complete portfolio 2. Develop a simplified record keeping system 3. Initiate and maintain records for the personal SAE <p>E. Classroom/Lab Safety and Management</p> <ol style="list-style-type: none"> 1. Develop classroom safety rules 2. Develop lab safety rules 3. Follow safe procedures in laboratory investigations <p>F. Problem Solving</p> <ol style="list-style-type: none"> 1. Relate the problem-solving process to the scientific method 2. Describe the steps in the scientific method 3. Differentiate between problem solving and the scientific method 	<p>SI-H-A1 SI-H-B1 LS-S-G1 SE-H-D5, D6</p> <p>SI-H-B1, B2 SE-H-C5</p> <p>SE-H-B4, B5 SE-H-D1, D2</p> <p>SI-H-B3</p> <p>SI-H-A7 LS-H-G1</p> <p>SI-H-A1, A4, A5 SI-H-B1, B2, B4, B5</p>

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TOPICS	BENCHMARKS
<p>II. Agricultural Leadership</p> <p>A. Introduction to the National FFA Organization</p> <ol style="list-style-type: none"> 1. Understand the aims and purposes of the FFA 2. Determine the organizational structure of the FFA at national, state and local levels 3. Serve as a member of a standing committee in the local FFA chapter <p>B. Individual and Team Development Through FFA Opportunities</p> <ol style="list-style-type: none"> 1. Develop a personal plan of activities for participation in the FFA 2. Write and present a three minute speech 3. Earn the Greenhand degree <p>C. Development of Interpersonal Skills</p> <ol style="list-style-type: none"> 1. Make an introduction 2. Demonstrate official FFA attire 3. Discuss personal presentation 	<p>SI-H-A3, A4, A6</p>
<p>III. Animal Science</p> <p>A. Animal Anatomy and Physiology</p> <ol style="list-style-type: none"> 1. Diagram and identify the name and functions of the major parts of an animal cell 2. Describe the process of cell division 3. Identify the primary external parts of an animal 4. Determine the primary muscle groups that form the essential external parts of the animal 5. Analyze the components and functions of the respiratory and circulatory systems 6. Identify the major parts of the skeletal system used in livestock selection 	<p>SI-H-A2 LS-H-A1 LS-H-B2 LS-H-F1, F3 LS-H-G2, G3</p>

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<p>B. Animal Selection Based on Physiology and Genetics</p> <ol style="list-style-type: none"> 1. Distinguish among the major breeds or production types of the primary livestock species 2. Determine the market classes and market grades used for the primary meat yielding mammals 3. Explore the influence of pedigrees, blood tests and DNA tests on livestock selection 4. Visually determine the primary criteria for stock selection in each major type of livestock mammal 5. Orally develop reasons for the placement and selection of market, breeding, and performance animals <p>C. Diseases and Parasites</p> <ol style="list-style-type: none"> 1. Distinguish between good health and poor health of animals 2. Distinguish among the primary causal factors of the major types of animal disease 3. Develop a plan for disease prevention for one species of livestock 4. Determine common signs of parasite infestations in livestock 5. Classify the major parasite groups that affect livestock 6. Develop a plan for control of parasites in livestock 	<p>LS-H-B1, B3, B4 LS-H-C2-C5 LS-H-F3</p> <p>LS-H-C6, C7 LS-H-D1, D3, D4 LS-H-F3, F4 LS-H-G1-G5 SE-H-C1, C5 SE-H-D3-D6</p>
<p>IV. Soil Science</p> <p>A. Soil Formation</p> <ol style="list-style-type: none"> 1. Define <i>soil</i> 2. Distinguish among the major horizons of a soil profile 3. Discuss the factors and conditions that influence soil formation and condition 4. Identify the major components of a soil 5. Determine the effects of each soil component on plant growth 	<p>ESS-H-C1, C3, C5 SE-H-C1, C3 PS-H-A2</p>

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<p>B. Soil Properties</p> <ol style="list-style-type: none"> 1. Describe soil by its physical properties 2. Distinguish among physical, chemical, and biological properties of soil 3. Distinguish between homogenous and heterogenous mixtures in a soil 4. Distinguish between elements, compounds and mixtures in soils 5. Explain how compounds can be distinguished from mixtures 6. Explain the effects of cation-exchange capacity on plant production <p>C. Soil pH</p> <ol style="list-style-type: none"> 1. Describe the properties of acids and bases 2. Differentiate between strong acids and weak acids, strong bases and weak bases 3. Use the pH scale to calculate and measure the concentration of OH¹ ion in soil samples 4. Relate soil pH to nutrient availability 5. Investigate the effects of soil pH on plant growth 6. Develop a plan for changing soil pH to meet crop needs 	<p>PS-H-A2 PS-H-B2 PS-H-C1-C5</p> <p>PS-H-D2-D4,D6, D7</p>
<p>V. Energy Conservation</p> <p>A. Energy Usage in Agriculture</p> <ol style="list-style-type: none"> 1. Describe the common energy transformations used to produce power for agriculture 2. Identify common types of power used in agricultural operations 3. Describe the inherent flaws of common engines used in agriculture <p>B. Sources of Energy</p> <ol style="list-style-type: none"> 1. Investigate the availability of fossil fuels in addition to the environmental effects of each type of fossil fuel 2. Describe the common applications of fossil fuels in agriculture 3. Identify possible alternative power sources for agricultural usage 	<p>PS-H-C5, C7 PS-H-E1, E3 PS-H-F1, F2</p> <p>SE-H-B1, B2 PS-H-F1, F2</p>

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<p>VI. Plant Science</p> <p>A. Plant Growth</p> <ol style="list-style-type: none"> 1. Describe the functions of external plant parts 2. Classify plants by their common uses 3. Describe the life cycle of a crop plant 4. Describe the functions of the parts of the plant cell 5. Compare and contrast the processes of photosynthesis and respiration 6. Differentiate between plant and animal cells 7. Describe the process and the role of osmosis in plant growth 8. Analyze the roles of carbohydrates, lipids, and proteins in plants and animals <p>B. Plant Environments</p> <ol style="list-style-type: none"> 1. Determine the roles of plant nutrients for plant growth 2. Describe the effects of external factors (gravity, light, temperature) on plant adaptation and development 3. Explain the limiting factor concept <p>C. Cultural Practices for Plants</p> <ol style="list-style-type: none"> 1. Analyze the effects of "weeds" on crop and plant production 2. Identify major categories of weeds 3. Develop weed control system for crop production 4. Identify potential hazards in the use of pesticides 5. Describe the relationship between moisture and plant growth 6. Diagram and explain the hydrologic cycle 	<p>LS-H-A1-A3 LS-H-C1-C6 LS-H-E1-E3 LS-H-F1, F2 PS-H-D4, D5, D7 ESS-H-A1, A2</p> <p>LS-H-F1, F4 PS-H-G1, G4 ESS-H-A5, A6</p> <p>LS-H-D2, D3, D4 ESS-H-B1 PS-H-G3 SE-H-A2, A3</p>
<p>VII. Food Science</p> <p>A. History and Trends of Food Processing</p> <ol style="list-style-type: none"> 1. Define <i>food preservation</i> 2. Identify five common historical methods of food preservation 3. Describe current technologies for food preservation 4. Discuss current trends in food preservation technologies 	<p>LS-H-B4 LS-H-G2</p>

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<p>B. Chemical and Biological Food Deterioration</p> <ol style="list-style-type: none"> 1. Analyze the major causes of deterioration in food products 2. Analyze the effects of methods used to prevent food deterioration 3. Plan a sanitation program for implementation in a food processing laboratory <p>C. Food Processing Methods</p> <ol style="list-style-type: none"> 1. Describe the primary types of food processing 2. Compare food processing techniques for a variety of food types 	<p>LS-H-D1 LS-H-E1</p> <p>LS-H-G2, G4, G5</p>
<p>VIII. Agricultural Mechanics</p> <p>A. Introduction/Safety</p> <ol style="list-style-type: none"> 1. Describe the role of agricultural mechanics in food and fiber production 2. Demonstrate safety behavior for mechanical shop usage 3. Demonstrate safety awareness <p>B. Woodworking/Construction</p> <ol style="list-style-type: none"> 1. Demonstrate usage of common measuring devices used in agricultural mechanical work 2. Apply geometric principles to agricultural mechanics 3. Use basic mathematical calculations in agricultural mechanics 4. Identify common tools in the agricultural mechanics laboratory 5. Demonstrate proper usage of common tools 6. Describe common fasteners 7. Select appropriate fasteners for various applications 8. Develop a working plan and drawing for completing a project 9. Follow the working plan to complete the project 	<p>PS-H-F1, F2</p>

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<p>C. Electricity</p> <ol style="list-style-type: none">1. Distinguish between AC and DC currents2. Diagram and/or identify parallel and series circuits3. Measure and calculate electrical power and energy4. Describe the applications of a variety of switches for agricultural applications5. Design a safe circuit to fulfill an agricultural application6. Wire a circuit for an agricultural application	<p>PS-H-E1, E2, E4 PS-H-F1, F2 PS-H-G2, G4</p>

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