

Course Title:	Food Science & Safety
Grade(s):	11th/12th

Course Description
This hands-on course investigates food processing, distribution, and marketing. Topics will include: food microbiology, food processing and engineering, biotechnology with foods, toxicology, regulations, and safe handling of foods. Students will learn about topics through lab-based activities performed in our food science lab. Students will understand the use of sensory evaluation, nutrition label development, new food product development, and food processing in the agriculture industry.
Approved Curricular Materials/Textbook(s)
Agricultural Science Education Food Science Curriculum

Unit Title	Unit Description (Include Unit Objectives)	Unit Pacing
Unit 1: Introduction to Food Science	This is an introductory unit allowing students to explore the food science industry and the importance of food science in our world today. Students will: • Evaluate foods using sensory evaluation. • Research the date and significance of a food science discovery, scientist, organization, or event. • Organize key events in food science history into a timeline. • Measure foods using imperial measurements and compare accuracy to the metric system.	2 weeks
Unit 2: Food Safety	In this unit, students will learn how to safely operate in the food lab both at school, at home, and in the food industry. Ensuring food safety requires a comprehensive understanding of the biological, chemical, and physical hazards that can contaminate food and implementing effective practices and regulations to mitigate these risks. Maintaining rigorous safety standards from production to consumption	2 weeks

	can protect public health and prevent foodborne illness, ensuring a safe and reliable food supply. Students will: • Identify biological, chemical, and physical hazards in a kitchen. • Diagram and describe the location of emergency equipment and safety hazards. • Publish and present a sign for display that outlines the proper tools for a personal hygiene topic. • Demonstrate knife safety skills while cutting fruits and vegetables. • Diagram and describe the location of emergency equipment and safety hazards.	
Unit 3: Local Foods	In this unit, students will explore the local food movement and production systems. Students will visit a local farm and learn about proper harvest techniques and how to use local foods in food science. Students will: • Identify the steps to food-safe food harvesting. • Identify foods produced locally during each season. • Describe how using local food helps minimize environmental impacts.	2 weeks
Unit 4: Food Chemistry	Students will: • Research the function of nutrients in foods and human health. • Use indicators to determine the presence of food nutrients. • Inspect amylose and amylopectin in starches under a microscope. • Observe the viscosity, retrogradation, syneresis, texture, stability, and opacity of starches. • Compare protein elasticity in different flours and its effect on sensory characteristics. • Compare how saturated and unsaturated fat content affects sensory characteristics.	3 weeks
Unit 5: Processing & Preservation	Students will: • Identify changes to the physical characteristics of a raw commodity during food processing. • Process foods and identify unit operations.	4 weeks

	• Study the effects of water on microbes by removing water from fruit. • Research regulatory agencies and the laws that they regulate. • Determine which agency is responsible for regulating specific food products.	
Unit 6: Health & Security of Food Systems	Students will: • Locate required claims, required information, and consumer warnings on food labels. • Calculate the caloric content of foods based on nutritional content. • Identify the nutrient contents of each ingredient for a food product and prepare a nutrition panel. • Analyze local food insecurity statistics. • Develop solutions to possible situations of food insecurity in their community. • Evaluate vulnerabilities toward intentional adulteration of a processing plant. • Develop a food defense plan.	2 weeks
Unit 7: Food Consumers	Students will: • Evaluate a menu and consider choices based on nutrition, price, acceptance, convenience, and culture. • Participate in sensory evaluation, modeling factors to identify biases. • Discuss how non-relevant factors can manipulate the perception of panelists. • Construct and conduct a sensory evaluation and analyze the outcome. • Compare different advertisements and determine how the marketer addresses the Four Ps. • Evaluate a food package using a crush, drop, and water test. • Evaluate a food retailer and evaluate product placement.	2 weeks
Unit 8: Food Product Development	In this unit, students will be asked to find a need in the food industry and develop a new food product. Developing new food products requires a blend of creativity, scientific knowledge, and an understanding of consumer preferences. By integrating principles of food science, nutrition, and sustainable practices, students will create food products that are appealing, nutritious, environmentally responsible, and aligned with current market trends.	3 weeks

	Students will: • Start the food product development process by choosing a food to innovate. • Collect and summarize research about similar products with patented solutions. • Conduct a feasibility analysis for a new food product. • Test market a food product. • Prepare a food product for commercialization. • Justify that a developed product meets consumer needs. • Develop a display to highlight new food products.	
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