

FOOD SCIENCE

Food Science is a two semester course that provides students with an overview of food science and the role it plays in the securing of a safe, nutritious, and adequate food supply. A project-based approach is utilized in this course, along with laboratory, team building, and problem solving activities to enhance student learning. Students are introduced to the following areas of horticulture science: food processing, food chemistry and physics, nutrition, food microbiology, preservation, packaging and labeling, food commodities, food regulations, issues and careers in the food science industry.

Food Science prepares students for many careers in agriculture, and more specifically food science. These careers include but are not limited to: Distribution and Production, Inspection, Marketing, and Product Development.

Course Specifications

- DOE Code: 5102
- Recommended Grade Level: Grade 9-12
- Recommended Prerequisites: Introduction to Agriculture, Food, and Natural Resources
- Credits: 1 credit per semester, maximum of 2 credits
- Fulfills a Life Science or Physical Science requirement for the General Diploma only or counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas

Dual Credit

This course provides the opportunity for dual credit to students who meet postsecondary requirements for earning dual credit and successfully complete the dual credit requirements of this course.

Application of Content

Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards based training plan for students participating in work-based learning experiences.

Career and Technical Student Organizations (CTSOs)

Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students are encouraged to participate in FFA, the CTSO, in the most closely related subject matter areas.

Content Standards

Domain - History and Current Trends of the Food Industry

Core Standard 1 Explain the scope of the food industry and the historical and current developments of food products and processing.

Standards

- FS-1.1 Discuss the history and current trends to describe and explain the components (e.g., processing, distribution, byproducts) of the food products and processing industry.
- FS-1.2 Analyze the similarities and differences amongst policies and legislation that affect the food products, processing systems, and supply in the U.S. or around the world.
- FS-1.3 Analyze food production and distribution outcomes based on cultural customs.
- FS-1.4 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, organics, microorganisms, contamination, irradiation).

Core Standard 2 Identify and explain the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems.

Standards

- FS-2.1 Evaluate the purposes and changes in the food products and processing industry brought about by industry organizations or regulatory agencies
- FS-2.2 Explain the importance, application, and usage of industry standards in food products and processing
- FS-2.3 Prepare an implementation plan for industry standards in food products and processing systems

Domain - Food Safety Principles and Processing Systems

Core Standard 3 Students develop and implement procedures to ensure safety, sanitation, and quality in food product and processing facilities.

Standards

- FS-3.1 Describe contamination hazards (physical, chemical and biological) associated with food products and processing
- FS-3.2 Outline procedures to eliminate possible contamination hazards associated with food products and processing
- FS-3.3 Analyze the effectiveness of a food product and processing company's Critical Control Point (CCP) procedures
- FS-3.4 Analyze and document attributes and procedures of current safety programs in food products and processing facilities.
- FS-3.5 Assess specifications and maintenance needs for equipment and processing systems (e.g., specifications for machines, sanitation procedures, repair protocol, etc.)

Core Standard 4 Students apply safety and sanitation procedures to understand the handling, processing and storing of food products.

Standards

- FS-4.1 Explain and demonstrate techniques and procedures for the safe handling of food products
- FS-4.2 Describe the importance of and perform quality-assurance tests on food products
- FS-4.3 Describe the effects food-borne pathogens have on food products and humans
- FS-4.4 Conduct and interpret microbiological tests for food-borne pathogens and implement corrective procedures
- FS-4.5 Discuss documentation procedures in a food products and processing system
- FS-4.6 Explain safety standards that must be observed in facility design and equipment use
- FS-4.7 Outline guidelines for personnel safety in the food products and processing industry
- FS-4.8 Evaluate a facility to determine the implementation of safety procedures

Domain - The Science and Nutrition of Food Products and The Processing Industry

Core Standard 5 Students apply principles of nutrition, biology, microbiology, chemistry, and human behavior to make healthy food selections.

Standards

- FS-5.1 Discuss essential nutrients (proteins, carbohydrates, fats, vitamins, minerals, and water).
- FS-5.2 Explain the application of chemistry and physics to food science.
- FS-5.3 Explain the myPlate recommendations in relation to essential nutrients for the human diet.
- FS-5.4 Identify common food additives (e.g., preservatives, antioxidants, buffers, stabilizers, colors, flavors).
- FS-5.5 Identify the key components of a food label and their significance to create an informed consumer.

Domain - Processing, Preservation, Quality Control, and Packaging of Food Products

Core Standard 6 Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

Standards

- FS-6.1 Identify and assign quality and yield grades to meat, poultry, fish, dairy, fruits, vegetables, grains, legumes, and oilseeds.
- FS-6.2 Select raw food products based on yield grades, quality grades and related selection criteria.
- FS-6.3 Perform quality-control inspections of raw food products for processing.

- FS-6.4 Identify and describe acceptable animal treatment and processing techniques.
- FS-6.5 Explain desirable and undesirable characteristics of both pre-mortem and post-mortem animals in relation to the inspection and production of food products.

Core Standard 7 Students will apply processes, preservation, packaging and food presentation to food products for sale and distribution to understand product development.

Standards

- FS-7.1 Compare weights and measurements of products and perform conversions between units of measure.
- FS-7.2 Outline appropriate methods and prepare foods for sale and distribution for different markets.
- FS-7.3 Analyze and document food preservation processes and methods on a variety of food products.
- FS-7.4 Analyze the degree of desirable food qualities of foods stored in various packaging.
- FS-7.5 Explain materials and methods of food packaging and presentation.
- FS-7.6 Describe factors in planning and developing a new food product.

Domain - Careers

Core Standard 8 Students examine the scope of career opportunities in and the importance of agriculture to the economy.

Standards

- FS-8.1 Evaluate the nature and scope of natural resources in agriculture, society, and the economy
- FS-8.2 Describe career opportunities and means to achieve those opportunities in natural resources
- FS-8.3 Identify how key organizational structures and processes affect organizational performance and the quality of products and services.
- FS-8.4 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.

Domain - Leadership

Core Standard 9 Students validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education.

Standards

- FS-9.1 Communicate clearly, effectively, and with reason through speaking, writing, visuals, and active listening in formal and informal settings
- FS-9.2 Recognize and explain the role of the FFA in the development of leadership, education, employability, communications and human relations skills.
- FS-9.3 Examine roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.
- FS-9.4 Acquire the skills necessary to positively influence others.
- FS-9.5 Develop a skill set to enhance the positive evolution of the whole person.

Domain - Supervised Agriculture Experience

Core Standard 10 Students validate the necessity of a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education.

Standards

- FS-10.1 Explain the nature of and become familiar with those terms related to an SAE program.
- FS-10.2 Explore the numerous possibilities for an SAE program which a student might develop.
- FS-10.3 Develop an individual SAE program and implement record keeping skills.