

FOOD SCIENCE & PROCESSING TECHNOLOGY

PROGRAM STANDARDS

2018

Approved by the State
Board of Education
August 29, 2019

CONTENT STANDARD 1.0: FOOD INDUSTRY AND HISTORICAL DEVELOPMENT

Performance Standard 1.1: Evaluate the Significance and Implications of Changes and Trends in the Food Products and Processing Industry

- 1.1.1 Discuss historical changes in the food products and processing industry.
- 1.1.2 Evaluate current trends in the food products and processing industry (e.g., dietary food guides, niche markets, marketing trends).
- 1.1.3 Identify consumer concerns related to food quality and safety (such as allergens, antibiotic use, genetically modified organisms (GMOs), pesticide use, and food borne illnesses).
- 1.1.4 Discuss the economic implications when low-quality and unsafe foods enter the market.
- 1.1.5 Describe the scope and economic importance of agriculture and food processing in the United States and the world, using quantitative data compiled by government agencies and news media.
- 1.1.6 Examine the impact of consumer trends on food products and processing practices (e.g., health and nutrition, organic, information about food products, local food movements, farm-to-fork supply chains, food system transparency).
- 1.1.7 Compare and contrast cultural differences regarding food products and processing practices.
- 1.1.8 Identify and explain environmental and safety concerns about the food supply.
- 1.1.9 Evaluate desirable and undesirable outcomes of emerging technologies used in the food products and processing industry.

Performance Standard 1.2: Investigate Industry Organizations, Groups, and Regulatory Agencies Affecting the Food Products and Processing Industry

- 1.2.1 Explain the purposes of organizations that are part of and/or regulate the food products and processing industry.
- 1.2.2 Determine the relationship between regulatory agencies (i.e., FDA, USDA, CDC, WHO) and the food products and processing industry.
- 1.2.3 Assess the changes in the food products and processing industry brought about by industry organizations or regulatory agencies.

CONTENT STANDARD 2.0: FOOD SAFETY AND SANITATION

Performance Standard 2.1: Create Sanitation Standard Operating Procedures and Master Sanitation Schedules

- 2.1.1 Create Sanitation Standard Operating Procedures (SSOP) for a food processing company.
- 2.1.2 Understand Good Manufacturing Practices (GMP) and how they relate to a food processing company and employee and equipment hygiene.
- 2.1.3 Create Master Sanitation Schedule (MSS) for a food processing company.

Performance Standard 2.2: Create a Food Safety Plan, Understand the Biological, Chemical, and Physical Hazards Associated with Food Processing and Handling

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- 2.2.1 Understand and evaluate the different biological hazards (prions, bacteria, viruses, protozoans, etc.) that could be present in the raw ingredient through processing and distribution of a food product.
- 2.2.2 Understand and evaluate the different chemical hazards (pesticides, herbicides, allergens, paints, heavy metals, dioxins, PCBs, etc.) that could be present in the raw ingredient through processing and distribution of a food product.
- 2.2.3 Understand and evaluate the different physical hazards (metal, plastic, rubber, etc.) that could be present in the raw ingredient through processing and distribution of a food product.
- 2.2.4 Identify potential sources of contamination.
- 2.2.5 Develop strategies to eliminate or reduce contamination to an acceptable level.
- 2.2.6 Discuss current regulatory food safety programs, including HACCP (Hazard Analysis Critical Control Point), FSP (Food Safety Plan), and Food Defense.

Performance Standard 2.3: Apply Sanitation Procedures in the Handling, Processing, and Storing of Food Products

- 2.3.1 Evaluate food product handling procedures.
- 2.3.2 Explain the importance of microbiological tests (e.g., ATP, equipment swabs, Environmental swab, Pathogen Environmental Monitoring -PEM) in food sanitation verification.
- 2.3.3 Explain the importance of allergen cross-contact and how sanitation affects allergen management.
- 2.3.4 Discuss documentation procedures and their importance in a food processing and distribution system.
- 2.3.5 Understand how Clean in Place (CIP) and Clean Out of Place (COP) affects overall sanitation of a facility.
- 2.3.6 Understand the use of chemical types and applications and how it affects plant sanitation procedures.

CONTENT STANDARD 3.0: PERSONAL SAFETY

Performance Standard 3.1: Understand Worker Safety Principles in a Manufacturing Facility

- 3.1.1 Outline guidelines for personnel safety in the food products and processing industry (e.g., lockout-tagout, personal protective equipment, permit required confined space, machine guarding, walking working surfaces, motorized vehicles).
- 3.1.2 Perform a safety risk analysis of a manufacturing facility, including behavior based accident preventions.
- 3.1.3 Create mitigation strategies (engineering, administrative, and PPE) focusing on controls.
- 3.1.4 Demonstrate the ability to follow safety and operational procedures in a lab setting and satisfactorily complete a safety test.

CONTENT STANDARD 4.0: THE SCIENCE OF FOOD PRODUCTS

Performance Standard 4.1: Apply Principles of Science to Provide a Safe, Wholesome, and Nutritious Food Supply

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- 4.1.1 Design a research project in food science using the scientific method.
- 4.1.2 Examine, interpret, and explain the meaning of required components on a food label.
- 4.1.3 Determine a strategy to prepare and label foods according to the established standards of regulatory agencies (including nutrition facts panel, ingredients, weights, and measures, allergens, etc.).

Performance Standard 4.2: Evaluate, Grade, and Classify Processed Food Products

- 4.2.1 Perform quality control inspections of raw and finished food products.
- 4.2.2 Explain how the chemical and physical properties of foods influence nutritional value and eating quality.
- 4.2.3 Compare and contrast foods stored under varying conditions for quality, shelf life, and intended use.
- 4.2.4 Design and construct experiments for quality assurance tests on food products.
- 4.2.5 Interpret and evaluate results of quality assurance tests on food products and examine steps to implement corrective procedures.

Performance Standard 4.3: Understand the Constituents of Food (e.g., Lipids, Proteins, Carbohydrates, Water, Vitamins, Minerals)

- 4.3.1 Differentiate between the common food constituents (i.e., proteins, carbohydrates, fats, vitamins, minerals, and water).
- 4.3.2 Compare and contrast food constituents and their relative value to product taste, appearance, and so forth.
- 4.3.3 Research and report methods of nutritional planning to meet essential needs for the human diet (e.g., MyPlate).

Performance Standard 4.4: Understand and Recognize the Different Additives in Food and Purposes of Use in Processing

- 4.4.1 Identify common food additives and identify their properties (e.g., preservatives, antioxidants, buffers, stabilizers, colors, flavors).
- 4.4.2 Describe the purpose of common food additives (CFA).
- 4.4.3 Describe how CFAs influence the chemistry of food.

Performance Standard 4.5: Research and Development

- 4.5.1 Identify the steps of research and development in the food production and processing industry.
- 4.5.2 Outline the process for designing a new food product from concept to production.
- 4.5.3 Identify the needs and mechanics of a plant scale test.

CONTENT STANDARD 5.0: FOOD PROCESSING OPERATIONS AND TECHNOLOGY

Performance Standard 5.1: Process Food and Food Products for Sale and Distribution

- 5.1.1 Understand principles of raw material/ingredient receiving.
- 5.1.2 Create a flow diagram for food production process steps.
- 5.1.3 Identify packaging processes and logistics (e.g., sub packaging, case filling, palletizing).
- 5.1.4 Understand principles of production scheduling, product storage, and distribution.

Performance Standard 5.2: Preserve Food and Food Products for Sale and

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Distribution

- 5.2.1 Describe factors related to food preservation.
- 5.2.2 Describe factors that contribute to food deterioration.
- 5.2.3 Preserve foods using various methods and techniques.
- 5.2.4 Identify and summarize purposes of food storage procedures (e.g. temperature regulation, monitoring).
- 5.2.5 Prepare plans that ensure implementation of proper food storage procedures and traceability.
- 5.2.6 Differentiate between methods and materials used for processing food for different markets (e.g., fresh food products, ready to eat food products, organic).

Performance Standard 5.3: Food Process Technology and Maintenance

- 5.3.1 List and categorize types of equipment used in food products and processing systems including automated systems.
- 5.3.2 List and apply strategies to maintain equipment and facilities for food products and processing systems (Preventative Maintenance).
- 5.3.3 Describe Piping and Instrumentation Diagrams as they relate to food processing.
- 5.3.4 Describe the principles of Operational Technology (OT) and how they relate to larger Information Systems (Big Data Analytics, Statistical Process Control).
- 5.3.5 Identify the role of Robotics in Food Processing and Packaging.

CONTENT STANDARD 6.0: EXPLORE CAREER OPPORTUNITIES

Performance Standard 6.1: Understand Employment Fields in the Food Science Technology Industry

- 6.1.1 Identify potential careers in the food science and processing industry.
- 6.1.2 Interview current food science/processing professionals.
- 6.1.3 Demonstrate employability skills for a career in the food science and processing industry (e.g., create a resume and cover letter, participate in job interviews).
- 6.1.4 Research additional industry certifications available (i.e., Serve safe, HACCP, OSHA, PCQI).

CONTENT STANDARD 7.0: LEADERSHIP TRAINING THROUGH AGRICULTURAL EDUCATION

Performance Standard 7.1: Recognize the Traits of Effective Leaders and Participate in Leadership Training through Involvement in FFA

- 7.1.1 Demonstrate effective leadership and participation in leadership training.
- 7.1.2 Expand leadership experience by participating in a chapter activity.
- 7.1.3 Participate in a career development event at the local level or above.
- 7.1.4 Exhibit leadership skills by demonstrating proper parliamentary procedure.
- 7.1.5 Participate in a speech or presentation activity.

Performance Standard 7.2: Understand the Importance of School and Community Awareness

- 7.2.1 Participate in a school improvement or community development project.

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CONTENT STANDARD 8.0: SUPERVISED AGRICULTURAL EXPERIENCE (SAE)

Performance Standard 8.1: Maintain a Supervised Agricultural Experience

- 8.1.1 Accurately maintain SAE record books.
- 8.1.2 Investigate the proficiency award areas related to SAE program area.
- 8.1.3 Actively pursue necessary steps to receive higher degrees in FFA.