North Dakota Agriculture Education

ENVIRONMENTAL SYSTEMS

Develop and implement procedures to ensure safety, sanitation, and quality in food product and processing facilities.

1 **Distinguish between various food safety programs and management systems in food products and processing facilities.** 7.1

1 Summarize the purposes and objectives of safety programs in food products and processing facilities (e.g., Sanitation Standard Operating Procedures (SSOP); Good Manufacturing Practices (GMP); worker safety, etc.). 7.1.1

2 Identify common equipment used in food products and processing systems (e.g., packaging, mixing, cooling, heating, preservation, etc.) and describe their function. 7.1.2

3 Compare and contrast the different aspects of safety programs (e.g., Sanitation Standard Operating Procedures (SSOP); Good Manufacturing Practices (GMP); worker safety, etc.). 7.1.3

4 Operate equipment used in food products and processing systems (e.g., dehydrator, food processor, mixer, grinder, etc.). 7.1.4

5 Construct plans that ensure implementation of safety programs for food products and processing facilities. 7.1.5

6 Construct food product protocols and parameters (Standard Operating Procedures) based upon equipment used in food products and processing. 7.1.6

2 **Apply food safety and quality assurance procedures in the harvesting, handling, and processing of food products.** 7.2

1 Identify hazards associated with food products and processing (e.g., physical, chemical, and biological). 7.2.1

2 Identify cross-contamination hazards associated with food products and processing (e.g., waterborne, airborne, and personnel, etc.). 7.2.2

3 Describe systematic approaches to control food safety (e.g., Hazard Analysis and Critical Control Points Plan (HACCP); Critical Control Point procedures (CCP); Good Agricultural Practices Plan (GAP), etc.). 7.2.3

4 Summarize the purposes and objectives of quality assurance and food safety tests on food products (e.g., produce safety regulation, safe food transport, food contaminants, etc.). 7.2.4

5 Describe the effects food-borne pathogens have on food products and humans. 7.2.5

6 Outline procedures to control possible hazards associated with food products and processing. 7.2.6

Skip to main content

7 Outline procedures to control possible cross-contamination hazards associated with food products and processing. 7.2.7

8 Develop plans that ensure implementation of safe handling procedures on food products. 7.2.8

9 Conduct quality assurance tests on food products. 7.2.9

10 Execute the procedures of microbiological tests used to detect food-borne pathogens. 7.2.10

11 Evaluate the effectiveness of a control method implemented. 7.2.11

12 Evaluate the effectiveness of a cross-contamination control method implemented (e.g., allergen swabbing). 7.2.12

13 Interpret outcomes from safe handling procedures and results from quality assurance tests. 7.2.13

14 Evaluate results of quality assurance tests on food products and examine steps to implement corrective procedures. 7.2.14

15 Interpret microbiological tests for food-borne pathogens. 7.2.15

---

3 **Apply food safety procedures during storage and distribution to ensure food quality.** 7.3

1 Summarize purposes of food storage procedures (e.g., first in/first out, temperature regulation, monitoring, etc.). 7.3.1

2 Describe different electronic and paper-based documentation methods used to meet food safety and quality goals in food products and processing systems. 7.3.2

3 Analyze characteristics of food products and determine appropriate storage procedures. 7.3.3

4 Demonstrate methods of documentation procedures within food products and processing systems. 7.3.4

5 Prepare plans that ensure implementation of proper food storage procedures. 7.3.5

6 Recommend improvements to a documentation procedure used within a food products and processing facility. 7.3.6

Apply principles of nutrition, biology, microbiology, chemistry and human behavior to the development of food products.

4 **Apply principles of nutrition and biology to develop food products that provide a safe, wholesome, and nutritious food supply for local and global food systems.** 7.4

1 Summarize properties of common food constituents (e.g., proteins, carbohydrates, fats, vitamins, minerals). 7.4.1

2 Describe methods of nutritional planning to meet essential needs for the human diet. 7.4.2

3 Compare and contrast the relative value of food constituents relative to food product qualities (e.g., taste, appearance, etc.). 7.4.3

Compare and contrast the nutritional needs of different human diets. 7.4.4

Skip to main content

5 Analyze the properties of food products to identify food constituents and evaluate nutritional value. 7.4.5

6 Construct methods to design a healthy daily food guide for a variety of nutritional needs. 7.4.6

5 Apply principles of microbiology and chemistry to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems. 7.5

1 Describe the basic chemical makeup of different types of food. 7.5.1

2 Identify common food additives and their properties (e.g., preservatives, antioxidants, buffers, stabilizers, colors, flavors, etc.). 7.5.2

3 Summarize the application of biochemistry in the development of new food products (e.g., value added food products, genetically engineered food products, etc.). 7.5.3

4 Explain how the chemical and physical properties of foods influence nutritional value and eating quality. 7.5.4

5 Analyze the purpose of common food additives and how they influence the chemistry of food. 7.5.5

6 Analyze how food products and processing facilities use biochemistry concepts to develop new food products. 7.5.6

7 Design experiments to determine the chemical and physical properties of food products. 7.5.7

8 Devise strategies to determine what additives are utilized and why they are included in a variety of food products. 7.5.8

9 Develop plans to engineer new food items using bio-chemistry concepts. 7.5.9

6 Apply principles of human behavior to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems. 7.6

1 Explain the importance of food labeling to the consumer. 7.6.1

2 Summarize relevant factors in planning and developing a new food product (e.g., regulation, creativity, economics, etc.). 7.6.2

3 Analyze the required components on a food label. 7.6.3

4 Determine consumer preference and market potential for a new food product using a variety of methods (e.g., double-blind testing, sensory evaluation testing, etc.). 7.6.4

5 Determine a strategy to prepare and label foods according to the established standards of regulatory agencies. 7.6.5

6 Design new food products that meet a variety of objectives (e.g., consumer preferences, market, nutritional needs, regulatory requirements, etc.). 7.6.6

Se pr Skip to main content **mplement selection, evaluation, and inspection techniques to ensure safe and uality food products.** 7.7

distribution and consumption.

1 Summarize characteristics of quality and yield grades of food products. 7.7.1

2 Summarize procedures to select raw food products based on yield grades and quality grades. 7.7.2

3 Describe protocols for inspection and harvesting techniques for animal food products (e.g., pre-mortem and post- mortem inspections, Food Safety Inspection Service guidelines (FSIS), etc.). 7.7.3

4 Describe foods and byproducts derived from different classifications of food products (e.g., meat, egg, poultry, fish, dairy, fruits, vegetables, grains, legumes, oilseeds, etc.). 7.7.4

5 Analyze factors that affect quality and yield grades of food products. 7.7.5

6 Assemble procedures to perform quality-control inspections of raw food products for processing. 7.7.6

7 Analyze inspection and harvesting of animals using regulatory agency approved or industry-approved techniques. 7.7.7

8 Examine desirable qualities of food products derived from different classifications of food products. 7.7.8

9 Outline procedures to assign quality and yield grades to food products according to industry standards. 7.7.9

10 Evaluate care and handling procedures to maintain original food quality and yield. 7.7.10

11 Respond to consumer concerns about the inspection and harvesting techniques of animals using accurate information based on regulatory agency approved or industry-approved techniques. 7.7.11

12 Evaluate food products from different classifications of food products. 7.7.12

8 **Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.** 7.8

1 Explain English and metric measurements used in the food products and processing industry. 7.8.1

2 Describe methods and materials used for processing food for different markets (e.g., fresh food products, ready to eat food products, etc.). 7.8.2

3 Identify methods of food preservation. 7.8.3

4 Summarize types of materials and methods used in food packaging and presentation. 7.8.4

5 Perform conversions between units of measure. 7.8.5

6 Prepare foods for sale and distribution for different markets. 7.8.6

7 Apply strategies to preserve different foods using various methods and techniques. 7.8.7

8 Analyze the degree of desirable food qualities of food stored in various packaging. 7.8.8

Skip to main content

9 Design plans to formulate and package food products using a variety of weights and measures. 7.8.9

10 Evaluate food quality factors on foods prepared for different markets (e.g., shelf life, shrinkage, appearance, weight, etc.). 7.8.10

11 Recommend strategies to preserve different foods using various methods and techniques. 7.8.11

12 Implement methods of selecting packaging materials to store a variety of food products. 7.8.12

---

9 Create food distribution plans and procedures to ensure safe delivery of food products. 7.9

1 Describe the environmental impact of distributing food locally and globally. 7.9.1

2 Describe the various paths food products take to get from food processing centers to consumers. 7.9.2

3 Summarize different types of market demands for food products (e.g., local food, organic, non-GMO, etc.). 7.9.3

4 Compare ways to reduce environmental impact from food distribution activities. 7.9.4

5 Examine safety procedures used in food distribution to ensure a safe product is being delivered to consumers. 7.9.5

6 Assess how market demand for food products influences the distribution of food products. 7.9.6

7 Defend a strategy to determine ways for food distribution to reduce environmental impacts. 7.9.7

8 Make recommendations to improve safety procedures used in food distribution scenarios to ensure a safe product is being delivered to consumers. 7.9.8

9 Propose distribution plans for food products that meet specific market demands. 7.9.9

Explain the scope of the food industry and the historical and current developments of food product and processing.

10 Examine the scope of the food industry by evaluating local and global policies, trends, and customs for food production. 7.10

1 Summarize examples of policy and legislation that affect food products and processing systems in the United States and internationally (e.g., labeling, GMOs, biosecurity, food system policy, dietary guidelines, etc.). 7.10.1

2 Describe the impact of consumer trends on food products and processing organic practices (e.g., health and nutrition, organic, information about food products, local food movements, farm-to-fork supply chains, food system transparency, etc.). 7.10.2

3 Summarize cultural differences regarding food products and processing practices. 7.10.3

Skip to main content

4 Analyze the similarities and differences amongst policies and legislation that affect the food products and processing system in the U.S. or internationally. 7.10.4

5 Implement methods to obtain data on food consumer trends in a specific market. 7.10.5

6 Analyze food production and distribution outcomes based on cultural customs. 7.10.6

7 Defend a personal point of view on policies and legislation that affect the food products and processing system in the U.S. or internationally 7.10.7

8 Create food products that meet a specific consumer trend in a specific market. 7.10.8

9 Design culturally sensitive food processing and distribution practices. 7.10.9

11 Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems. 7.11

1 Describe the components of the food products and processing industry (e.g., processing, distribution, byproducts, etc.). 7.11.1

2 Explain environmental and safety concerns about the food supply. 7.11.2

3 Describe current and emerging technologies related to food products and processing (e.g., high pressure processing of foods, automation, biotechnology, etc.). 7.11.3

4 Analyze significant changes and trends in the food products and processing industry. 7.11.4

5 Summarize current issues related to the safety and environmental concerns about foods and food processing (e.g., GMOs, irradiation, micro-organisms, contamination, etc.). 7.11.5

6 Analyze desirable and undesirable outcomes of emerging technologies used in the food products and processing systems. 7.11.6

7 Predict upcoming changes and trends in the food products and processing industry. 7.11.7

8 Respond to consumer concerns about the environment and safety of the food supply using accurate information regarding food products and processing systems and practices. 7.11.8

9 Evaluate the feasibility of implementing a current or emerging technology to improve a current food product or process used in a facility. 7.11.9

12 Identify the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems. 7.12

1 Summarize the purposes of organizations that influence or regulate the food products and processing industry. 7.12.1

2 Describe the importance and usage of regulatory oversight of food safety and security in food products and processing (e.g., internationally, nationally, state, and local). 7.12.2

Skip to main content

3 Analyze the changes in the food products and processing industry brought about by industry organizations or regulatory agencies. 7.12.3

4 Assess the application of industry standards in the food products and processing industry. 7.12.4

5 Create methods to obtain data about organizations, groups, and regulatory agencies that affect the food products and processing industry. 7.12.5

6 Create plans that ensure adherence to industry standards for food products and processing facilities. 7.12.6

---

13 Evaluate the effectiveness of current sustainability practices in their role to food products and processing 7.13

1 Describe what sustainability is within the food industry. 7.13.1

2 Identify various practices for sustainable food production, distribution, and waste (e.g., rooftop farming, composting, regenerative agriculture, vertical farming, short supply chains). 7.13.2

3 Summarize why sustainability plays a key role in the food industry. 7.13.3

4 Analyze the performance and efficiency of various practices for sustainable food production, distribution, and waste. 7.13.4

5 Create a plan to educate on what food sustainability is. 7.13.5

6 Design a program for a facility to promote sustainable food production, distribution, and waste. 7.13.6