Ohio CTE: Agricultural and Environmental Systems

Food Science

The Science of Food: Differentiate the structures, functions, and sources of ingredients and the roles they play in food product development for human nutrition. 7.1	**1** Classify components of foods into nutrient categories. 7.1.1
	2 Identify sources and forms of energy in foods. 7.1.2
	3 Measure and describe the role of pH in food processing and storage. 7.1.3
	4 Measure and describe water activity and differentiate how water activity affects food functionality and storage. 7.1.4
	5 Describe the composition and structure of sugars, complex carbohydrates, lipids, vitamins, minerals, and proteins. 7.1.5
	6 Identify sources of sugars, complex carbohydrates, lipids, vitamins, minerals, and proteins, and their nutritional contributions to dietary needs. 7.1.6
	7 Relate the functions and physical properties of simple and complex carbohydrates, lipids, vitamins, minerals, and proteins (i.e., functional ingredients) to the manufacturing of food products. 7.1.7
	8 Describe the roles of enzymes as catalysts and the factors that affect enzyme activity. 7.1.8
	9 Differentiate the metabolic processes and the factors that affect metabolic changes in the human body, including anabolism, catabolism, and basal metabolism. 7.1.9
	10 Identify and describe the functions of food additives in food products. 7.1.10
	11 Identify and describe regulations regarding food additives. 7.1.11
	12 Identify the characteristics and properties of mixtures and select and apply appropriate chemical or biological separation techniques. 7.1.12
Quality Assurance: Inspect the food production process and locate potential sources of food quality and safety deviations in facilities. 7.2	**1** Describe the types of spoilage (e.g., oxidation, microbial), their sources and impact. 7.2.1
	2 Describe the quality attributes (e.g. color, flavor, texture) that a food product possesses. 7.2.2
	3 Identify molds, bacteria, viruses, prions, and yeast and describe their roles in food production. 7.2.3

4 Identify molds, bacteria, viruses, prions, and yeast and describe how they reproduce and factors that affect their growth. 7.2.4

5 Test food quality through chemical, microbiological, sensory, and physical methods. 7.2.5

6 Evaluate, inspect, and select raw food products for manufacturing, based on raw ingredient specifications. 7.2.6

7 Develop a quality check list, based on finished food product attributes, specifications, and regulations. 7.2.7

8 Identify elements commonly included on the principal display and information panels on a food product. 7.2.8

9 Compare and contrast food safety, food fraud, and food defense. 7.2.9

10 Describe the relationship between timeliness of processing or production to product quality. 7.2.10

11 Identify the importance of data collection and management and its relationship to a quality assurance program. 7.2.11

12 Record and manage data relevant to a quality assurance program. 7.2.12

Meat Science: Identify the role of inspection, sanitation, food safety, and proper harvesting practices; the role of carcass evaluation and grading on meat quality and percent saleable products and cutting guidelines from primal to retail meat cuts. 7.3

1 Identify the benefits and roles of antemortem inspection in relation to food safety. 7.3.1

2 Identify the benefits and roles of postmortem inspection in relation to food safety. 7.3.2

3 Describe humane harvesting techniques and their impact on meat quality. 7.3.3

4 Remove and inspect offal postmortem for signs of disease or contamination. 7.3.4

5 Prepare a carcass through species-specific techniques for postmortem inspection. 7.3.5

6 Describe the role and impacts of the conversion of muscle to meat-on-meat quality. 7.3.6

7 Evaluate and describe the role of marbling on overall quality grade. 7.3.7

8 Evaluate retail cuts of meat to determine both quality and economic value. 7.3.8

9 Determine the maturity of an animal using skeletal ossification and lean maturity ratings and determine those impacts on the overall quality grade per USDA grading. 7.3.9

	10 Calculate the percentage of saleable products from yield grades utilizing the USDA formula in estimating percent boneless closely trimmed retail cuts. 7.3.10
	11 Calculate beef carcass value using a grid-based marketing system. 7.3.11
	12 Fabricate carcasses into species-specific wholesale and retail cuts. 7.3.12
Food Production and Processing: Process a safe shelf stable food product for distribution and consumption. 7.4	1 Describe the processes used in food preservation, control the variables, and apply biological processing methods. 7.4.1
	2 Describe the process of dehydration and concentration, control the variables that affect the quality of dried foods and apply the methods. 7.4.2
	3 Describe the functions and types of packaging operations, equipment, and materials and use them to manufacture food products (e.g., metal, glass, paper, plastic, film, laminates, edible coatings, biodegradable). 7.4.3
	4 Process food through mixing, grinding, pumping, and washing, and describe the physical change in the food product. 7.4.4
	5 Identify and apply food grading systems and standards of identity. 7.4.5
	6 Compare and contrast storage and distribution methods for shelf-stable and non-shelf-stable products. 7.4.6
	7 Differentiate among beneficial microorganisms (e.g., bacteria, mold, yeast) and their uses in food production. 7.4.7
	8 Process food products through biological processing. 7.4.8
	9 Describe the role of enzymes as catalysts and factors that affect enzyme activity in the fermentation process. 7.4.9
	10 Determine the environmental impacts and manage the waste of processing a food product. 7.4.10
Food Product Development: Apply principles of nutrition and human behavior to create a new food prototype. 7.5	1 Conduct a sensory evaluation of food products. 7.5.1
	2 Identify consumer preferences, trends, and opportunities affecting food product development. 7.5.2
	3 Manipulate ingredients to meet a desired product goal. 7.5.3
	4 Identify nutrient values, serving sizes, and nutrient variability for a food product. 7.5.4
	5 Calculate the amounts of restricted ingredients in food products. 7.5.5
	6 Develop a food product package and label according to industry standards. 7.5.6

	7 Estimate the shelf life and potential changes in attributes over time. 7.5.7
	8 Create a new product roll out plan (e.g., concept, bench trial, market assessment, industrial trial, consumer acceptance). 7.5.8
Food Safety and Sanitation: Describe a food safety and sanitation plan, addressing processing facility needs and contamination points. 7.6	1 Identify and control food product allergens. 7.6.1
	2 Establish and implement procedures for preoperational inspection and cleaning. 7.6.2
	3 Identify the sources and most prevalent types of food borne bacteria and pathogens to account for the potential of their entrance into the food supply. 7.6.3
	4 Describe good manufacturing practices and the correlating corrective actions. 7.6.4
	5 Identify and describe foodborne hazards. 7.6.5
	6 Identify and describe points in production where food safety hazards can be controlled. 7.6.6
	7 Identify and describe critical limits. 7.6.7
	8 Identify and describe a corrective active plan. 7.6.8
	9 Identify the key activities (e.g., recall exercise, regulatory notification) of a recall program. 7.6.9
	10 Identify the government agencies involved in the regulation and governance of food production. 7.6.10
	11 Compare and contrast food security and food defense. 7.6.11
	12 Identify sources of physical, biological, radiological, and chemical tampering points. 7.6.12
	13 Manage the biosecurity of raw materials and finished products during transportation. 7.6.13