# Food Science II - 18310
## Kansas Agriculture Education

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Key to Integrated Competencies (CD)- Career Development (L)- Leadership (E)- Experienced Based (C) – Communications (M) - Math (S) - Science

**G1-3 Explaining the Development Process of New Food Products: LK HS21, HS22, MS36, HS72**

3 2 1 0 Understand the importance of supermarket inventory management CD

3 2 1 0 Outline the product life cycle CD

3 2 1 0 Describe the research and development process CD

3 2 1 0 Explain the importance of packaging for new food products

**G1-4 Describing the Marketing of Foods**

3 2 1 0 Define the utilities provided by the food marketing system

3 2 1 0 Describe the functions provided by the food marketing system

3 2 1 0 List and define the 4 Ps of marketing

3 2 1 0 Describe the type of markets for food products

3 2 1 0 Explain the role of public food programs

**G2-1 Assessing The Role Of Governments in Food Economics**

3 2 1 0 Explain concentration ration

3 2 1 0 Identify the government's role in ensuring competition in the food markets

3 2 1 0 Define workable competition

3 2 1 0 Define the government's role in promoting food safety

3 2 1 0 Explain the government's role in ensuring food security

**G2-2 Associating Food Economics with Economic Development: LK MS59, HS102**

3 2 1 0 List and define the most common challenges facing developing countries

3 2 1 0 Explain why nations specialize and trade

3 2 1 0 Explain the role of Public Law 480 in promoting economic development.

3 2 1 0 Understand the role of trade agreements

**Issues in Food Science**

**H1-1 Using Genetic Engineering with FooF**

3 2 1 0 Understand the terms "genetic engineering," "GMO," and "transgenic." S

3 2 1 0 Learn how GMOs are created in the laboratory S

3 2 1 0 Discover the uses of GMOs

3 2 1 0 Find out about the regulation of GMOs

3 2 1 0 Learn about the future of GMOs

**H1-2 Debating the Pros and Cons of Genetically Modified Foods**

3 2 1 0 Acquire a basic understanding of how GMOs are formed S

3 2 1 0 Become familiar with positive aspects of GMOs in food

3 2 1 0 Become familiar with the negative aspects of GMOs in foods

3 2 1 0 Improve ability to debate issues for future leadership roles C

3 2 1 0 Improve written communication skills C

**H2-1 Analyzing the Supply of Food For An Increasing World Population**

3 2 1 0 Describe the roles of governments in the food supply

3 2 1 0 Describe the relationship between technology and food

3 2 1 0 Describe how food production affects economic development

**H2-2 Exploring Future Food Products**

3 2 1 0 Describe the role of biotechnology in food science S

3 2 1 0 Describe some future food products from improved crops

3 2 1 0 Describe the future of food producing animals

**H2-3 Addressing Environmental Concerns Related to Food Production and Processing**

3 2 1 0 Describe the methods of disposing of food processing solid wastes

3 2 1 0 Discuss wastewater issues related to food processing

3 2 1 0 Describe the wastewater treatment process S

**FFA, SAE and Food Science**

3 2 1 0 Promote the FFA chapter/or program to the public

3 2 1 0 Participate in Career Development Events activities related to food science

3 2 1 0 Identify issues in food science pertinent to t community

3 2 1 0 Create a plan to address issues of food science in a way that benefits the community

3 2 1 0 Complete and evaluate community outreach programs in food science

3 2 1 0 Develop, manage and evaluate SAE

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3 2 1 0 Identify general properties and characteristics of produce (fruits and vegetables)
3 2 1 0 Identify harvesting methods for produce CD
3 2 1 0 Describe proper handling and storing of produce CD
3 2 1 0 Identify enzyme activity detrimental to fruit and vegetable storage S
3 2 1 0 Identify alternative methods for preserving produce

**D2-11 Producing Beverages**

3 2 1 0 Identify the types of beverages produced in the food industry
3 2 1 0 Identify sweeteners used in beverages
3 2 1 0 Describe characteristics of soft drinks
3 2 1 0 Describe characteristics of non-carbonated and "healthy beverages
3 2 1 0 Describe the process for making beer and wine

**D2-12 Producing Candies and Sweets**

3 2 1 0 Explain how sugar is produced
3 2 1 0 Define and classify confectioneries
3 2 1 0 Explain the process of sugar reduction and why it is important S
3 2 1 0 Explain how chocolate is produced
3 2 1 0 Describe the confectionary manufacturing process CD

**D2-13 Processing of Fats and Oils**

3 2 1 0 Identify the sources of fats and oils used in food processing
3 2 1 0 List the different properties of fats and oils S
3 2 1 0 Describe the production and processing methods of fats and oils
3 2 1 0 List the essential fatty acids and explain why they are important S
3 2 1 0 Identify key health issues related to fats and oils

**D3-1 Using Safe Methods in Storing Foods in the Home: LK HS41, AHS32**

3 2 1 0 Describe methods of safely storing foods in the home E
3 2 1 0 Identify potential food storage problems in homes E

**D3-2 Following Safe Methods in Handling and Preparing Foods in the Home**

3 2 1 0 Describe methods of safely handling and preparing foods in the home E
3 2 1 0 Describe the importance of cooking meats to the proper temperatures E
3 2 1 0 Observe a meal being prepared in the home and identify potential safety issues E

**Food Packaging and Labeling**

**E1-1 Explaining the importance of food packaging: LK HS30, HS50, HS54**

3 2 1 0 Explain the importance of food packaging
3 2 1 0 Identify the characteristics of a food packaging material

**E1-2 Describe Various Aspects of a Package**

3 2 1 0 Identify the different materials and forms of food packages
3 2 1 0 Explain the three different types of food packaging containers

**E2-1 Explaining the Importance of a Food Label: LK MS30, HS30, HS37**

3 2 1 0 Explain the importance of food labels
3 2 1 0 Identify foods affected by food labeling

**E2-2 Analyzing the Contents of a Food Label**

3 2 1 0 Identfiy the parts of a food label
3 2 1 0 Explain the format of a nutrition panel
3 2 1 0 Define terms that may be found on a food label C

**Food Safety**

**F1-1 Determining Risks Associated with Food**

3 2 1 0 Explain the difference between true and perceived risks L
3 2 1 0 Identify risks that can be caused by food
3 2 1 0 Identify ways that risk can be eliminated

**F1-2 Explain Potential Carcinogenic Hazards Associated with Food**

3 2 1 0 Define carcinogens S
3 2 1 0 Identify carcinogenic hazards associated with foods S

**F1-3 Explaining Potential Pesticide Hazards Associated with Food**

3 2 1 0 Identify the benefits of using pesticides
3 2 1 0 Identify the risks of using pesticides
3 2 1 0 Explain how pesticide levels can be reduced

**F2-1 Identifying Government Agencies That Regulate Food: LK MS27, HS12, HS16, HS33, HS103, HS118**

3 2 1 0 Discuss the Food and Drug Administration
3 2 1 0 Discuss the Food Safety and Inspection Service
3 2 1 0 Discuss the Environmental Protection Agency
3 2 1 0 Discuss the United States Department of Agriculture

**F2-2 Complying With GMP and HACCP**

3 2 1 0 Define and explain the importance of GMP
3 2 1 0 Define and explain the HACCP system in food safety

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**D1-2 Practicing Personal Hygiene in Food Processing**

3 2 1 0 Describe the importance of personal hygiene in food processing. CD

3 2 1 0 Describe methods of demonstrating good personal hygiene habits. CD

**D1-3 Describing the Cleanliness of Processing Equipment**

3 2 1 0 Describe the importance of the cleanliness of food processing equipment. CD

3 2 1 0 Identify factors that affect the cleanliness of food processing equipment. CD

**D1-4 Maintaining a Clean Processing Plant: LK MS20, HS9, HS62, HS96**

3 2 1 0 Identify factors that affect cleanliness in a food processing plant CD

3 2 1 0 Describe the importance of cleanliness in a food processing plant CD

**D2-1 Using Approved Practices in Handling and Processing Dairy Products**

3 2 1 0 Explain milk handling from the cow to the processing plant

3 2 1 0 Describe the processing of fluid milk

3 2 1 0 Describe the processing of milk products and by-products E

**D2-2 Identifying Dairy Products**

3 2 1 0 Identify fluid milk products

3 2 1 0 Identify processed milk products

3 2 1 0 Distinguish milk products from non-dairy products CD

**D2-3 Describing Proper Handling of Red Meat**

3 2 1 0 Describe proper handling of red meat prior to cooking CD

3 2 1 0 Explain recommended red meat cooking procedures

3 2 1 0 Identify recommended storage of cooked meats

**D2-4 Identifying Cuts of Meat**

3 2 1 0 Explain the difference between primal and retail cuts CD

3 2 1 0 Explain the process of determining whether meat is beef, veal, pork or lamb CD

3 2 1 0 Identify beef and veal cuts CD

3 2 1 0 Identify pork cuts CD

3 2 1 0 Identify lamb cuts CD

**D2-4A Quality and Yield Meat Grading**

3 2 1 0 Explain the difference between quality grades of meat CD

3 2 1 0 Explain how the quality grade influences the taste of meat CD M

3 2 1 0 Explain the factors that influence yield grade of meat CD M

3 2 1 0 Calculate Yield Grade

**D2-5 Discussing the Processing of Meat: LK HS83, HS96**

3 2 1 0 Explain slaughtering/harvesting CD

3 2 1 0 Describe cutting, grinding, and blending meat E

3 2 1 0 Explain tenderizing processes (aging, cubing, chemical/electrical treatment, and marinating) E

3 2 1 0 Describe preservation methods (dehydrating, curing, smoking, canning, freezing, freeze drying and irradiating) E

**D2-6 Handling and Processing Poultry and Eggs: LK HS83, HS96**

3 2 1 0 Become familiar with poultry meat production

3 2 1 0 Describe the steps in processing poultry CD

3 2 1 0 Describe the grading process for poultry and eggs CD

3 2 1 0 Identify the parts of egg

3 2 1 0 Describe the steps in egg processing CD

**D2-7 Handling and Processing Fish and Shellfish: LK HS83, HS96**

3 2 1 0 Identify types of fish and shellfish used for food

3 2 1 0 Define aquaculture S

3 2 1 0 Identify spoilage issues related to seafood

3 2 1 0 Identify methods of preserving fish

3 2 1 0 Describe the commercial processing of fish CD

**D2-8 Processing Cereal Grain: LK HS83, HS96**

3 2 1 0 List the general structure and composition of a grain seed S

3 2 1 0 Describe the grain milling process CD

3 2 1 0 List the types of flour and explain their uses

3 2 1 0 Describe the processing of breakfast cereals CD

3 2 1 0 Explain the concept of "value-added" agriculture in terms of cereal grains

**D2-9 Identifying Cereal Products**

3 2 1 0 Identify the role of further processors

3 2 1 0 Identify common food products made from cereal grains

3 2 1 0 Identify industrial products made from cereal grains

3 2 1 0 Explain the importance of industrial products in increasing the demand for cereal grains

3 2 1 0 Identify the environmental benefits of using renewable resources for industrial products.

**D2-10 Handling and Processing Fruits and Vegetables: LK HS83, HS96**

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3 2 1 0 Differentiate between adsorbed water and bound water S

3 2 1 0 Identify the relationship between bound water and water activity S

3 2 1 0 Identify the function of water in heat transfer in foods S

**B2-2 Examining Lipids (Fats) in Food Physics**

3 2 1 0 Examine the structure of lipids S

3 2 1 0 Investigate controlled crystallization or tempering of lipids S

3 2 1 0 Recognized the effect of visible light upon the decomposition of fats S

3 2 1 0 Observe differences in melting points of fats that reflect strength of bonds S

3 2 1 0 Demonstrate liquid fate as a food conductor of heat S

**B2-3 Explaining Proteins in Food Physics**

3 2 1 0 Identify the structure of proteins S

3 2 1 0 Recognize physical properties of proteins S

3 2 1 0 Investigate the development of synergism S

3 2 1 0 Explain the structure of collagen and factors affecting it S

3 2 1 0 Identify factors that affect the functional properties of protein S

**B2-4 Explaining Carbohydrates in Foods Physics**

3 2 1 0 Identify functional properties of carbohydrates S

3 2 1 0 Recognize the structural differences and similarities in carbohydrates S

3 2 1 0 Recognize that the structure of the carbohydrate molecule affects the reaction and properties of compound S

3 2 1 0 Recognize that molecular size and weight affect the affinity of water by a sugar molecule S

3 2 1 0 Identify the effect of heat upon the starch molecule without water and with water S

**B3-1 Classifying Chemical Food Additives**

3 2 1 0 Define chemical food additive S

3 2 1 0 Explain the functions of food additives S

3 2 1 0 Identify the classifications for food additives S

**B3-2 Explaining Chemical Preservatives: LK HS61, HS111, AHS46**

3 2 1 0 Describe the function of chemical food preservatives S

3 2 1 0 Describe the mechanisms of chemical food preservatives S

3 2 1 0 Identify common types of chemical food preservatives S

**B3-3 Discussing Laws Related To Food Additives and Food Safety**

3 2 1 0 Identify the agencies that oversee food additive and food safety regulations

3 2 1 0 Identify the primary laws/regulations related to food additives and food safety

3 2 1 0 Describe the process for approving a food additive

3 2 1 0 Describe recent controversies over food additives C

**Food Microbiology**

**C1-1 Explaining Microbes and Food Spoilage Caused by Microbial Growth: LK HS42, HS51, HS127**

3 2 1 0 Describe food microbiology S

3 2 1 0 Describe different types of microbes S

3 2 1 0 Describe how microbes cause food spoilage S

**C1-2 Describing the Prevention of Food Spoilage**

3 2 1 0 Describe causes of food spoilage S

3 2 1 0 Describe methods of preventing food spoilage S

**C1-3 Identifying Food-Borne Illnesses and Their Prevention**

3 2 1 0 Describe the symptoms of food-borne illnesses

3 2 1 0 Describe the causes of food-borne illnesses S

3 2 1 0 Describe prevention of food-borne illnesses

**C2-1 Using Heat in Food Preservation**

3 2 1 0 Describe methods of using heat to preserve food S

3 2 1 0 Describe the role of time and temperature in heat preservation S

3 2 1 0 Describe the process of canning E

**C2-2 Using Cold in Food Preservation**

3 2 1 0 Describe methods of using cold to preserve food S

3 2 1 0 Describe the important variables in refrigerated cold preservation S

**C2-3 Using Drying, Chemical Additives and Irradiation in Food Preservation**

3 2 1 0 Describe the use of dehydration as a food preservation method S

3 2 1 0 Describe the use of irradiation as a food preservation method S

3 2 1 0 Describe the use of chemical additives as a food preservation method S

**C2-4 Using Fermentation**

3 2 1 0 Describe the fermentation process S

3 2 1 0 Describe the benefits of fermenting food

3 2 1 0 Identifying common foods that are preserved by fermentation.

**Handling and Processing Food**

**D1-1 Explaining the Importance of Sanitation: LK HS12, HS14, AHS19**

3 2 1 0 Describe the importance of sanitation.

3 2 1 0 Identify sources of contamination.

3 2 1 0 Differentiate between cleaning and sanitizing.

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Circle to indicate level of competency achieved:
3 Skilled-Works Independently 2 Limited skill-Needs assistance 1 Skill undeveloped-but received instruction 0 No exposure

**Introduction to Food Science:**

**The Food Industry**

**A1-1 Determining the Meaning and Importance of Food Science: LK HS 66, HS126**

3 2 1 0 Explain the concept of food science

3 2 1 0 Explain the importance of food science

3 2 1 0 Identify the segments of the food industry

**A1-2 Exploring Careers in Food Science: LK MS29, AHS 40**

3 2 1 0 Identify careers related to food science CD

3 2 1 0 Describe the education and skills needed for a career in food science CD

3 2 1 0 Identify the two main occupations involved in food science and the food science industry CD

**A1-3 Examining the Food Service Industry: LK HS18, HS111**

3 2 1 0 Describe the food service industry CD

3 2 1 0 Explain how food science and the food service industry are related CD

3 2 1 0 Identify trends to the food service industry CD

**Foods and Nutrition**

**A2-1 Explaining Human Digestion: LK MS 17, MS18, MS31, AHS13**

3 2 1 0 Explain the digestive process S

3 2 1 0 Identify the parts of the digestive system S

3 2 1 0 Identify secretions and enzymes that aid in the digestive process S

3 2 1 0 Identify types of digestive system disorders S

**A2-2 Describing the Major Food Nutrients: LK MS16, MS30, HS42, HS114**

3 2 1 0 Explain the importance of nutrition

3 2 1 0 Identify and describe the six major nutrients needed for good nutrition S

**A2-3 Determining the Impact of Diet on Health**

3 2 1 0 Explain how calories relate to nutrition MS

3 2 1 0 Explain claims made on food labels related to diet and health C

3 2 1 0 Describe the Recommended Dietary Allowance (RDA)

**Applying Chemistry and Physics to Foods**

**B1-1 Determining the Chemistry of Water in Foods**

3 2 1 0 Identify effects of hydrogen bonding in water S

3 2 1 0 Demonstrate the chemical function of water as a dispersing medium S

3 2 1 0 Indicate differences between water activity and moisture of food S

3 2 1 0 Show characteristics of water that affect its use S

**B1-2 Examining the Chemistry of Lipids (Fats)**

3 2 1 0 Identify the chemical composition of lipids S

3 2 1 0 Recognize the differences between saturated and unsaturated fats S

3 2 1 0 Examine the chemical changes that fats undergo S

3 2 1 0 Identify the functions of lipids in foods S

**B1-3 Examining the Chemistry of Proteins**

3 2 1 0 Identify chemical parts of proteins molecule S

3 2 1 0 Distinguish between conjugated proteins and nonconjugated proteins S

3 2 1 0 Recognize the different types of reactions of food proteins S

3 2 1 0 Identify the different properties of food proteins S

**B1-4 Describing the Chemistry of Carbohydrates**

3 2 1 0 Identify carbohydrates and their chemical composition S

3 2 1 0 Identify simple carbohydrates S

3 2 1 0 Identify functional properties of monosaccharides S

3 2 1 0 Identify large complex carbohydrates S

3 2 1 0 Identify functional properties of large complex carboyhydrates S

**B1-5 Discussing the Chemistry of Flavor Enhancing Substances**

3 2 1 0 Identify basic tastes S

3 2 1 0 Identify different flavor enhancing groups S

**B2-1 Investigating Water in Food Physics**

3 2 1 0 Identify the importance of hydrogen bonding in water molecular structure S