Food Science and Dietetics

8239/36 weeks

Table of Contents

Acknowledgments ......................................................................................................................................... 1
Course Description .................................................................................................................................. 2
Task Essentials Table .............................................................................................................................. 2
Curriculum Framework ............................................................................................................................ 5
Exploring Food Science and Dietetics ....................................................................................................... 5
Examining the Nutritional Composition of Foods ...................................................................................... 11
Implementing Risk Management ............................................................................................................. 25
Exploring Diet and Nutrition Fundamentals .............................................................................................. 39
Applying Nutritional and Dietary Requirements ........................................................................................ 49
Examining Food Processing, Preservation, and Packaging .......................................................................... 59
Examining Product Development ............................................................................................................. 70
Investigating Food Technology ................................................................................................................. 87
Investigating Food Sources and Systems .................................................................................................... 96
SOL Correlation by Task .......................................................................................................................... 101
Appendix: Credentials, Course Sequences, and Career Cluster Information ........................................... 106

Acknowledgments

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Virginia Department of Education

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Course Description

Suggested Grade Level: 11 or 12

Through laboratory and other practical experiences, students will develop a deeper appreciation for the food system and the impact of science on the food and nutrition industries. Students will explore food sources, the science and technology of food production and processing, and the implications for individual and global health and wellness. Career opportunities are broad and include health care; dietetics; and food research, development, and manufacturing.

Co-requisite: Chemistry
Suggested pre-requisite: Nutrition and Wellness

Task Essentials Table

- Tasks/competencies designated by plus icons (+) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (○) are optional
- Tasks/competencies designated by minus icons (☐) are omitted
- Tasks marked with an asterisk (*) are sensitive.

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploring Food Science and Dietetics</td>
<td></td>
</tr>
<tr>
<td>39 (+)</td>
<td>Describe food systems and U.S. consumption trends.</td>
</tr>
<tr>
<td>40 (+)</td>
<td>Explore the various careers in the food industry.</td>
</tr>
<tr>
<td>41 (+)</td>
<td>Analyze careers within the food science, food technology, dietetics, and nutrition industries.</td>
</tr>
<tr>
<td>42 (+)</td>
<td>Differentiate the pathways in the food science and dietetics industries.</td>
</tr>
<tr>
<td>Examining The Nutritional Composition of Foods</td>
<td></td>
</tr>
<tr>
<td>43 (+)</td>
<td>Define the function of carbohydrates.</td>
</tr>
<tr>
<td>44 (+)</td>
<td>Define the function of lipids.</td>
</tr>
<tr>
<td>45 (+)</td>
<td>Identify the functions of proteins.</td>
</tr>
<tr>
<td>46 (+)</td>
<td>Define the functions of vitamins, minerals, and phytochemicals in the diet.</td>
</tr>
<tr>
<td>Task No.</td>
<td>Task</td>
</tr>
<tr>
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</tr>
<tr>
<td>47 🟫</td>
<td>Analyze the effects of different processing methods on nutritional quality.</td>
</tr>
<tr>
<td>48 🟫</td>
<td>Identify the function of water activity and pH in food preparation and preservation.</td>
</tr>
<tr>
<td>49 🟫</td>
<td>Describe test methods for water activity and pH used in the food industry.</td>
</tr>
<tr>
<td>50 🟫</td>
<td>Identify food allergens and their origins as defined in the Food and Drug Administration (FDA) <em>Food Code</em>.</td>
</tr>
<tr>
<td>51 🟫</td>
<td>Describe how the presence of food allergens impacts the food industry’s testing processes and procedures for handling allergen contamination.</td>
</tr>
<tr>
<td>52 🟫</td>
<td>Explore various methods used to test for carbohydrates, protein, lipids, and vitamins and minerals.</td>
</tr>
</tbody>
</table>

**Implementing Risk Management**

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>53 🟫</td>
<td>Define Hazard Analysis Critical Control Point (HACCP).</td>
</tr>
<tr>
<td>54 🟫</td>
<td>Trace the flow of food in food-service operations.</td>
</tr>
<tr>
<td>55 🟫</td>
<td>Analyze risk factors and points of vulnerability in the food supply continuum, from source to production to distributor.</td>
</tr>
<tr>
<td>56 🟫</td>
<td>Identify the regulatory agencies and their primary roles, from food production through consumption.</td>
</tr>
<tr>
<td>57 🟫</td>
<td>Analyze risk factors that contribute to foodborne illnesses.</td>
</tr>
<tr>
<td>58 🟫</td>
<td>Describe methods for managing food allergens in a food system.</td>
</tr>
<tr>
<td>59 🟫</td>
<td>Identify the process of responding to foodborne illnesses and outbreaks.</td>
</tr>
<tr>
<td>60 🟫</td>
<td>Demonstrate Hazard Analysis Critical Control Point (HACCP) implementation.</td>
</tr>
<tr>
<td>61 🟫</td>
<td>Demonstrate practices and procedures that assure personal and workplace health and hygiene.</td>
</tr>
<tr>
<td>62 🟫</td>
<td>Perform a safety evaluation based on OSHA regulations.</td>
</tr>
</tbody>
</table>

**Exploring Diet and Nutrition Fundamentals**

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 🟫</td>
<td>Apply basic concepts of human nutrition.</td>
</tr>
<tr>
<td>64 🟫</td>
<td>Explain nutritional guidelines.</td>
</tr>
<tr>
<td>65 🟫</td>
<td>Describe factors affecting a person’s food preferences.</td>
</tr>
<tr>
<td>66 🟫</td>
<td>Describe food security with regard to food access (e.g., local, state, national, international).</td>
</tr>
<tr>
<td>67 🟫</td>
<td>Compare nutrient requirements across the life span.</td>
</tr>
<tr>
<td>68 🟫</td>
<td>Apply basic concepts of nutrition for meeting special dietary needs.</td>
</tr>
</tbody>
</table>

**Applying Nutritional and Dietary Requirements**

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>69 🟫</td>
<td>Identify food guidelines for various populations with special dietary needs.</td>
</tr>
<tr>
<td>70 🟫</td>
<td>Identify nutritional guidelines for persons with chronic health conditions.</td>
</tr>
<tr>
<td>Task No.</td>
<td>Task</td>
</tr>
<tr>
<td>----------</td>
<td>------</td>
</tr>
<tr>
<td>71</td>
<td>Interpret food-, nutrition-, and menu-labeling guidelines.</td>
</tr>
<tr>
<td>72</td>
<td>Assess the nutritional composition of meals.</td>
</tr>
<tr>
<td>73</td>
<td>Modify a recipe based on nutritional needs.</td>
</tr>
<tr>
<td>74</td>
<td>Develop a daily menu based on a modified diet.</td>
</tr>
</tbody>
</table>

**Examining Food Processing, Preservation, and Packaging**

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>Outline the history of food preservation and processing.</td>
</tr>
<tr>
<td>76</td>
<td>Examine the role of additives in processed foods.</td>
</tr>
<tr>
<td>77</td>
<td>Describe procedures that affect product quality performance.</td>
</tr>
<tr>
<td>78</td>
<td>Describe units of operation in food processing and preservation.</td>
</tr>
<tr>
<td>79</td>
<td>Examine the principles of fermentation.</td>
</tr>
<tr>
<td>80</td>
<td>Implement food preparation, production, and testing systems.</td>
</tr>
<tr>
<td>81</td>
<td>Analyze packaging materials with regard to types, functions, and environmental factors.</td>
</tr>
<tr>
<td>82</td>
<td>Explore how different packaging affects food/nutrient quality.</td>
</tr>
</tbody>
</table>

**Examining Product Development**

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>Review the history of food processing and product development.</td>
</tr>
<tr>
<td>84</td>
<td>Identify the need for food product development.</td>
</tr>
<tr>
<td>85</td>
<td>Review the process for food product development.</td>
</tr>
<tr>
<td>86</td>
<td>Analyze various marketing strategies that affect consumer food choices.</td>
</tr>
<tr>
<td>87</td>
<td>Explore consumer trends and how they impact the food industry and careers within it.</td>
</tr>
<tr>
<td>88</td>
<td>Analyze data to make food product marketing decisions.</td>
</tr>
<tr>
<td>89</td>
<td>Describe the role of science and food-science management in the development of new food products.</td>
</tr>
<tr>
<td>90</td>
<td>Explain basic chemistry concepts and how ingredients react in food-science applications.</td>
</tr>
<tr>
<td>91</td>
<td>Prepare food products for presentation and assessment.</td>
</tr>
<tr>
<td>92</td>
<td>Explain the purpose of sensory evaluation panels and how to conduct a sensory panel, using appropriate controls.</td>
</tr>
<tr>
<td>93</td>
<td>Identify food product development related to health and wellness needs.</td>
</tr>
<tr>
<td>94</td>
<td>Identify sustainable practices related to food-product development.</td>
</tr>
</tbody>
</table>

**Investigating Food Technology**

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>Describe examples of emerging trends that may impact careers in food science.</td>
</tr>
<tr>
<td>Task No.</td>
<td>Task</td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>96</td>
<td>Describe the functions, operations, and maintenance of test laboratory and related equipment and supplies.</td>
</tr>
<tr>
<td>97</td>
<td>Conduct testing for safety of food products, using up-to-date technology.</td>
</tr>
<tr>
<td>98</td>
<td>Describe the benefits of various technological advances on the scientific study, processing, and preparation of food products.</td>
</tr>
<tr>
<td>100</td>
<td>Identify ethical considerations for the use of food technologies.</td>
</tr>
</tbody>
</table>

**Investigating Food Sources and Systems**

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Compare various methods of food production.</td>
</tr>
<tr>
<td>102</td>
<td>Describe agricultural practices.</td>
</tr>
<tr>
<td>103</td>
<td>Identify the implications of local and globalized food sources.</td>
</tr>
<tr>
<td>104</td>
<td>Identify differences between international and U.S. food regulations.</td>
</tr>
</tbody>
</table>

**Curriculum Framework**

**Exploring Food Science and Dietetics**

**Task Number 39**

**Describe food systems and U.S. consumption trends.**

**Definition**

Description should include

- analyzing the food supply chain in the United States
- summarizing the impact on food supply and consumption of trends and concerns such as those related to
  - the environment
  - health
  - waste management
  - locally produced foods
  - vegetarian options
  - organically grown foods
  - genetically engineered foods.

**Process/Skill Questions**

**Thinking**

- What is my role in the food system?
- What health concerns have changed the way consumers eat when dining out?
- What is the difference between genetically engineered foods and organically grown foods?
Communication

- How do family food choices affect food supply?
- How can a food operation communicate to its customers food trends being offered in current cuisines?

Leadership

- How do individuals influence the food system?
- How can current and changing trends be set for a food operation?
- How can one be sure that food labeled as organic is actually organic?
- Which federal department is responsible for verifying organic status?
- What can be done to eliminate food waste in the United States?

Management

- How are individuals affected by the food system?
- How can food operations be sure that their food sources are reliable?

National Standards for Family and Consumer Sciences Education

9.2.9 Demonstrate waste disposal and recycling methods.

FCCLA National Programs and Competitive Events

Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event--STAR Events

- Career Investigation
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
• Sustainability Challenge
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.04.01. Examine the scope of the food industry by evaluating local and global policies, trends, and customs for food production.

Task Number 40

Explore the various careers in the food industry.

Definition
Exploration should include the fields of

• food science
• food technology
• dietetics
• nutrition.

Process/Skill Questions

Thinking

• What food-industry careers are available now and in the future?
• What trends and factors may influence possible careers in the food industry?
• What are the potential rewards of pursuing a career in the food science industry?

Communication

• What communication skills are necessary for a career in one of these fields?
• What resources are available for locating information on careers related to the food-science industry?

Leadership

• What leadership skills are important for success in a culinary-arts profession and/or a food-related career?
• How can leaders provide professional development in the food industry and food-science related pathways?

Management

• What kinds of jobs are available in the food-industry pathways?
• How could management encourage a strong work ethic among employees?

National Standards for Family and Consumer Sciences Education

9.1 Analyze career paths within food science, food technology, dietetics, and nutrition industries.

FCCLA National Programs and Competitive Events

Career Connection

• My Skills
• My Life
Task Number 41

Analyze careers within the food science, food technology, dietetics, and nutrition industries.

Definition

Analysis should include

- identifying careers within the food science, food technology, dietetics, and nutrition industries
- describing the various roles of individuals engaged in careers related to nutrition and dietetics.

Process/Skill Questions

Thinking

- What careers are involved in the food science, dietetics, and nutrition industry?
- What criteria can be used in career selection?
- Why is it important to research careers in the food science, dietetics, and nutrition industry?
- What values support a career selection?

Communication

- What communication skills are necessary for a career in this field?
- What questions need to be answered to make a wise career selection?
- How does communication assist in analyzing various career paths?

Leadership

- What leadership qualities are needed to be an entrepreneur in the food science, dietetics, and nutrition industry?
- How do leadership skills affect the success or failure of an entrepreneur?
- What strategies would bring about change in the public's perception of food science, dietetics, and nutrition careers?

Management
• What resources and training are required for a career in the food science, dietetics, and nutrition industry?
• What personal factors affect career choices and goals in the food science, dietetics, and nutrition industry?
• What might be the impact of long-term and short-term career goals on the food science, dietetics, and nutrition industry?

**National Standards for Family and Consumer Sciences Education**

9.1 Analyze career paths within food science, food technology, dietetics, and nutrition industries.

**FCCLA National Programs and Competitive Events**

**Career Connection**

• My Skills
• My Life
• My Career
• My Plan

**Power of One**

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

**Student Body**

• The Healthy You
• The Fit You
• The Real You
• The Resilient You

**Competitive Event--STAR Events**

• Career Investigation
• Entrepreneurship
• Food Innovations
• National Programs in Action
• Professional Presentation
• Sports Nutrition
• Sustainability Challenge
• Check the national website for on line events
• Check the website for Skill Events

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**Task Number 42**

**Differentiate the pathways in the food science and dietetics industries.**

**Definition**

Differentiation should include

• various careers in the food science and dietetics industry (e.g., food scientist, dietitian, food stylist, family and consumer sciences teacher and extension educator, government agency positions)
• opportunities for employment, advancement, and entrepreneurial endeavors
• education and training requirements and opportunities.

Process/Skill Questions

Thinking

• What are the food science, dietetics, and nutrition-management functions?
• What are the goals and standards of food science, dietetics, and nutrition management?
• Whose interests are served when we meet the goals of food science, dietetics, and nutrition management?

Communication

• How can we communicate effectively the functions of food science, dietetics, and nutrition management?
• What questions do we ask to clarify customer or client preferences and needs in relation to food science, dietetics, and nutrition management?
• Why is it important to communicate the needs of individuals, families, and society in terms of food science, dietetics, and nutrition management?

Leadership

• What skills do leaders need to implement food science, dietetics, and nutrition-management functions?
• How do we handle conflict in implementing food science, dietetics, and nutrition-management functions?
• What should be done to facilitate the implementation of food science, dietetics, and nutrition-management functions?
• How can we ensure that the team shares the same goals?

Management

• What resources are needed to implement food science, dietetics, and nutrition-management functions?
• What criteria should be used to evaluate food science, dietetics, and nutrition-management functions?
• Why is it important to evaluate criteria that is used in food science, dietetics, and nutrition-management functions?
• What are the consequences (positive and negative) of implementing food science, dietetics, and nutrition management functions? On employees? On a company? On individual customers or clients? On others?

National Standards for Family and Consumer Sciences Education

9.1.1 Explain the roles and functions of individuals engaged in food science, food technology, dietetics, and nutrition careers.

FCCLA National Programs and Competitive Events

Career Connection

• My Skills
• My Life
• My Career
• My Plan

Power of One

• A Better You
• Family Ties
• Working on Working
Examining the Nutritional Composition of Foods

Task Number 43

Define the function of carbohydrates.

Definition
Definition should include

- identifying the functions of carbohydrates in the diet
- summarizing how carbohydrates are produced through the process of photosynthesis
- identifying the functions of simple and complex carbohydrates
- identifying monosaccharides and disaccharides
- identifying the role and function of sugars in food products
- identifying starches and their role in food preparation.

Process/Skill Questions

Thinking

- What is the role of carbohydrates in a nutritious diet?
- How are carbohydrates produced through the process of photosynthesis?
- What is the role of carbohydrates in the treatment of diabetes?

Communication

- How can we distinguish between simple and complex carbohydrates?
- How are monosaccharides combined to form each of the disaccharides?
- What skills need to be development by the individual in the treatment of their diabetes?

Leadership
• What resources are needed to prepare food for people with lactose intolerance?
• How does the production of sugar from sugar cane compare to the production of corn syrup from corn?
• Does technology matter in the food production of sugar? Why, or why not?

Management

• What steps do school cafeteria managers need to take to provide healthy options for a diabetic student?
• What modifications would need to be made to the school lunch menu to provide healthy options for a diabetic student?
• What is the role of the individual in the management of their diabetes?

National Standards for Family and Consumer Sciences Education

9.3 Evaluate nutrition principles, food plans, preparation techniques, and specialized dietary plans.

FCCLA National Programs and Competitive Events

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Student Body

• The Healthy You
• The Fit You
• The Real You
• The Resilient You

Competitive Event--STAR Events

• Food Innovations
• Nutrition and Wellness
• Professional Presentation
• Sports Nutrition
• Check the national website for on line events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.

FPP.02.02. 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.

Task Number 44

Define the function of lipids.

Definition

Definition should include
• discussing the functions of lipids in food preparation (e.g., transferring heat, texturizing, aerating, enhancing flavoring, lubricating, serving as liquids in emulsion)
• discussing the optimal percentage of fat in an animal’s diet
• discussing the impacts of plant- and animal-based feed products with higher fat contents
• comparing the properties of monounsaturated fats, polyunsaturated fats, and saturated and unsaturated fatty acids
• listing the advantages and disadvantages of the use of monounsaturated fats, polyunsaturated fats, and saturated and unsaturated fatty acids in food preparation
• examining the functions of lipids in food preparation
• identifying the nutritional impact of lipids in the diet
• identifying glycerides and phospholipids
• listing the advantages and disadvantages of the use of glycerides and phospholipids in food preparation.

Process/Skill Questions

Thinking

• What are the basic functions of fat in food preparation?
• What are healthy choices among polyunsaturated and monounsaturated fats?
• What are the nutritional functions of lipids in the body?
• What organs do lipids in the body directly affect?
• What is the sole function of fat for the human body?
• What are the functions of fat-soluble vitamins in the diet?
• How does lipid oxidation affect food products?

Communication

• How are monounsaturated fats, polyunsaturated fats, and saturated and unsaturated fatty acids alike and different?
• What mechanisms or resources are available in educating the public about the advantages and disadvantages of lipids in the diet?
• Why is it important to determine the fat content of foods?

Leadership

• How do the physical characteristics of lipids affect the way they perform in food products?
• How does fat intake impact personal energy levels?
• What are the dangers of taking fat-soluble vitamins?

Management

• Why should restaurants periodically change the oil they use for frying?
• What are the advantages and disadvantages of using fat as a heat medium?
• What are the preferred preservation methods for foods that are higher in fat?

National Standards for Family and Consumer Sciences Education

9.3 Evaluate nutrition principles, food plans, preparation techniques, and specialized dietary plans.

FCCLA National Programs and Competitive Events

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

**Student Body**
• The Healthy You
• The Fit You
• The Real You
• The Resilient You

**Competitive Event—STAR Events**
• Food Innovations
• Nutrition and Wellness
• Professional Presentation
• Sports Nutrition
• Check the national website for online events
• Check the website for Skill Events

**The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards**

**FPP.02.01.** 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.

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**Task Number 45**

**Identify the functions of proteins.**

**Definition**
Identification should include

- functions of proteins in nutrition, food preparation, and production
- essential and nonessential amino acids
- complete and incomplete proteins
- process of denaturation of protein
- process of coagulation
- chemistry principles that pertain to protein food preparation (e.g., cooking eggs, milk, and meat products; preparing egg foams and meringues).

**Process/Skill Questions**

**Thinking**

- What is the importance of nonessential and essential amino acids in the production of antibodies and insulin?
- What is the basic molecular structure of amino acids?
- What incomplete proteins can substitute for essential amino acids?
- What is the difference between the structures of complete and incomplete proteins?
- What are the sources of complete and incomplete proteins?
- What is the role of protein in the treatment of diabetes?

**Communication**

- Which surgical procedures require an increased intake of protein? Why?
- What do we need to know about protein when evaluating food choices?
- What are the dangers of a diet high in protein?
Leadership

- What can cause a protein molecule to denature?
- What happens when protein foods are cooked at high temperatures for too long?

Management

- What are the differences between the primary, secondary, and tertiary structures of protein?
- Why do milk products require frequent stirring during preparation?
- What actions can individuals take to monitor protein intake?

National Standards for Family and Consumer Sciences Education

9.3 Evaluate nutrition principles, food plans, preparation techniques, and specialized dietary plans.

FCCLA National Programs and Competitive Events

Power of One

- A Better You
- Family Ties
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- Food Innovations
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- Sports Nutrition
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- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.

Task Number 46

Define the functions of vitamins, minerals, and phytochemicals in the diet.

Definition

Definition should include

- listing the vitamins and minerals and the eight groups of phytochemicals present in food
• describing the role of vitamins, minerals, and phytochemicals in the diet
• explaining the impact of food-preparation, food-processing, and food-preservation methods on vitamin and mineral value in food
• explaining the impact that food-preparation, food-processing, and food-preservation methods have on phytochemicals.

Process/Skill Questions

Thinking

• What are the functions and sources of vitamins, minerals, and phytochemicals?
• What are the differences between fat-soluble vitamins and water-soluble vitamins?
• What are the implications for improper levels of fat- and water-soluble vitamins in the diet?
• What are the functions and sources of minerals?
• What are the differences in the chemical compositions of vitamins and minerals?
• What diseases are related to deficiencies in fat- and water-soluble diets?
• What are the best food sources for fat- and water-soluble vitamins?
• What are the differences between micro and macro minerals?
• What are the dangers of adding vitamin, mineral, or phytochemical supplements to one’s diet?

Communication

• How does the intake of tea, wine, and cocoa relate to the reduction of diseases?
• How would you respond to someone who believes additives are harmful and should not be allowed in foods?
• How does one determine the need to add vitamin, mineral, or phytochemical supplements to one’s diet?

Leadership

• What role do the U.S. Department of Agriculture (USDA) and the Academy of Nutrition and Dietetics play in educating the public about vitamins, minerals, and phytochemicals?
• What is the effect of increased sodium intake in the diet?
• What actions should we take to reduce sodium intake?

Management

• What actions can individuals take to reduce vitamin and mineral losses during food storage and preparation?
• What factors can affect vitamin and mineral content in processed foods?
• What substance interferes with iron absorption? How does this occur?
• What substance increases iron absorption? How does this occur?

National Standards for Family and Consumer Sciences Education

9.3 Evaluate nutrition principles, food plans, preparation techniques, and specialized dietary plans.

FCCLA National Programs and Competitive Events

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA
Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event—STAR Events

- Food Innovations
- Nutrition and Wellness
- Professional Presentation
- Sports Nutrition
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.

Task Number 47

Analyze the effects of different processing methods on nutritional quality.

Definition

Analysis should include

- identifying how technology and processing methods have grown and changed the nutritional quality of foods over time
- comparing and contrasting processes used for home and commercial preservation
- examining the processes of curing, dehydration, freeze-drying, and extending the shelf life of fresh products (e.g., through refrigeration, modified atmosphere packaging, irradiation)
- identifying pretreatment necessary for food preservation (e.g., blanching, sulfiting, sulfuring).

Process/Skill Questions

Thinking

- What are the functions of food analogs?
- What diseases can occur as a result of the curing process of foods?
- How can some types of milk stay safe without being refrigerated?

Communication

- How is biotechnology used in the food industry?
- What do we need to know in order to compare reduced-oxygen packaging with other food packing methods?

Leadership

- What chemical and nutrient changes does irradiation cause in food products?
- What are the advantages and disadvantages of food irradiation as a preservation method?
Management

- What are the functions of food additives?
- What is the GRAS list?

National Standards for Family and Consumer Sciences Education

9.5 Demonstrate use of current technology in food product development and marketing.

9.5.5 Implement procedures that affect quality product performance.

9.6.2 Implement food preparation, production, and testing systems.

FCCLA National Programs and Competitive Events

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event--STAR Events

- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Sustainability Challenge
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.03. Apply principles of human behavior to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.

Task Number 48

Identify the function of water activity and pH in food preparation and preservation.

Definition

Identification should include
• properties of water
• functions of water in food preparation and storage
• sources of water and water contaminants
• effects of moisture on food safety
• properties of acids and bases
• use of pH scale
• results of water ionization.

Process/Skill Questions

Thinking
• What is the essential function of water as a nutrient for the body?
• What is the difference between distilled and deionized water?
• How do different types of water (e.g., tap, distilled, deionized) impact food preparation and storage?

Communication
• What factors must a food producer consider before choosing a heat-preservation method?
• Which processing method should be used for various foods canned at home? Why?
• Which methods should be used for commercial freezing? Why?

Leadership
• What laws and regulations reduce the risk of water contamination in your community?
• What factors affect the qualities of dried foods?
• What is being done to ensure safety of the water supply when it comes to national security?

Management
• How is the proper pH maintained during food processing?
• What is the relationship between water activity levels and food preservation?

National Standards for Family and Consumer Sciences Education

9.3 Evaluate nutrition principles, food plans, preparation techniques, and specialized dietary plans.

FCCLA National Programs and Competitive Events

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

STAND Up
• Assess
• Educate
• Advocate

Student Body
• The Healthy You
• The Fit You
• The Real You
The Resilient You

Competitive Event--STAR Events

- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Sustainability Challenge
- Teach and Train
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.02. 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.

Task Number 49

Describe test methods for water activity and pH used in the food industry.

Definition

Description should include

- methods for testing water activity ($A_w$)
- how to measure pH.

Process/Skill Questions

Thinking

- What are some examples of foods that have a high water content?
- How do you determine testing for water quality?
- How does the structure of a water molecule affect water’s physical characteristics?
- What is the function of water in food preparation?

Communication

- What do we need to know in order to understand the relationship between a safe water supply and disease management?
- What agencies are responsible for providing guidelines for safe drinking water?

Leadership

- How do routine sample readings of water sources impact food preparation?
- How do community water supply levels affect health disparities in local communities?

Management

- How does the water content of a food affect how the food will react during preparation and storage processes?
- What are the water-borne pathogens that can affect food supply and production?
National Standards for Family and Consumer Sciences Education

9.5.7 Conduct testing for safety of food products, utilizing available technology.

FCCLA National Programs and Competitive Events

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

Competitive Event--STAR Events

- Food Innovations
- Sustainability Challenge
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.02. 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.

Task Number 50

Identify food allergens and their origins as defined in the Food and Drug Administration (FDA) Food Code.

Definition

Identification should include

- outlining the purpose of the FDA Food Code
- defining the most common food allergens and their origins
- defining food sensitivity and food intolerance.

Process/Skill Questions

Thinking

- What are the most common treatments for food allergens, according to the FDA Food Code?
- What are the major food groups that account for 90 percent of food allergies?
- What is the difference between food sensitivity and food intolerance?

Communication

- What labeling regulations identify major allergens on food product labels?
- What actions should we take to prevent cross-contamination of foods with known allergens?

Leadership

- What regulations promote safe food manufacturing and processing facilities?
- What conditions need to be in place for a food recall?
Management

- How can we prevent cross-contamination of foods with potential allergens?
- What is the purpose of the FDA Food Code?

National Standards for Family and Consumer Sciences Education

9.2 Apply risk management procedures to food safety, food testing, and sanitation.

FCCLA National Programs and Competitive Events

Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event—STAR Events

- Focus on Children
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Check the national website for on line events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.01.02. Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.

FPP.03.02. Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

FPP.04.03. Identify and explain the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems.
Task Number 51

Describe how the presence of food allergens impacts the food industry’s testing processes and procedures for handling allergen contamination.

Definition
Description should include examining industry compliance for handling allergen contamination.

Process/Skill Questions
Thinking
- How can food be contaminated during manufacturing and processing operations?
- What procedures should be in place to prevent contamination during food-processing and food-manufacturing operations?

Communication
- What allergen testing is conducted during inspections to determine if a food has been contaminated and needs to be recalled?
- What are the components of enzyme-linked immunosorbent assay (ELISA) allergen testing?

Leadership
- What should be done to ensure allergen-free food products?
- How do you identify people with the G12 antibody?

Management
- What industry tests are available for the evaluation of livestock prior to harvesting?
- What food allergens fall under the mandatory Food Allergen Labeling and Consumer Protection Act (FALCPA) food-labeling law?

National Standards for Family and Consumer Sciences Education
9.2 Apply risk management procedures to food safety, food testing, and sanitation.

FCCLA National Programs and Competitive Events
Power of One
- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up
- Assess
- Educate
- Advocate

Competitive Event—STAR Events
- Professional Presentation
- Public Policy Advocate
Check the national website for online events
Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

**FPP.01.02.** Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.

**FPP.02.03.** Apply principles of human behavior to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.

**FPP.03.02.** Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

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**Task Number 52**

**Explore various methods used to test for carbohydrates, protein, lipids, and vitamins and minerals.**

**Definition**

Exploration should include
- LuGol's reagent and Benedict's solution (carbohydrates)
- grease spot and Sudan red test (lipids)
- biuret test (proteins)
- nutrient panel (vitamins and minerals).

**Process/Skill Questions**

**Thinking**
- What are names of methods used to test for carbohydrates? Protein? Fat? Vitamins and minerals?
- What information can be obtained from the various testing methods?

**Communication**
- What resources are available for locating information on tests for carbohydrates, protein, fat, and vitamins and minerals?
- What communication skills are necessary to complete the testing procedures?
- What will biuret testing results tell us about foods?
- Why are lipids important to daily nutrition?

**Leadership**
- What skills are needed to complete the test procedures?
- How can we ensure the testing procedures are followed?
- What should be done to facilitate the testing procedures?
- How could testing results affect an individual’s diet?

**Management**
- What resources are needed to complete the testing procedures?
- What criteria should be used to evaluate the results of testing procedures?
National Standards for Family and Consumer Sciences Education

9.5.7 Conduct testing for safety of food products, utilizing available technology.

FCCLA National Programs and Competitive Events

Power of One
- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

Competitive Event--STAR Events
- Food Innovations
- Nutrition and Wellness
- Professional Presentation
- Sports Nutrition
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.02. 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.

Implementing Risk Management

Task Number 53

Define Hazard Analysis Critical Control Point (HACCP).

Definition

Definition should include outlining an HACCP, which is defined by the FDA as “a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement, and handling, to manufacturing, distribution, and consumption of the finished product.”

Teacher resource: Hazard Analysis Critical Control Point (HACCP), U.S. Food and Drug Administration

Process/Skill Questions

Thinking
- What are the seven steps of HACCP?
- How do the seven steps help control food safety?
- What foods require a HACCP plan?
- What are the four types of hazards?
- How is critical control point (CCP) calculated?

Communication
- How is the importance of following a HACCP plan communicated to employees?
• Who is responsible for HACCP training?

Leadership
• Why is it important to report violations of the HACCP plan to proper authorities?
• What is the role of watch groups when it comes to fair and true labeling?

Management
• Who is responsible for ensuring that the HACCP plan is followed?
• What procedures are in place to oversee the HACCP plan?

FCCLA National Programs and Competitive Events

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Competitive Event--STAR Events
• Professional Presentation
• Public Policy Advocate
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The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

9.2.4 Use the Hazard Analysis Critical Control Point (HACCP) during all food handling processes (the flow of food) to minimize the risks of food borne illness.

Task Number 54

Trace the flow of food in food-service operations.

Definition
Tracing should include
• farm-to-table
• the supply chain
• the effect on high-risk populations
• factors that influence the safety of food.

Process/Skill Questions
Thinking
• How would you describe the flow of food in food-service operations?
• What factors will influence our decisions about food safety?
**Communication**
- How can we ensure food safety throughout the flow of food in food-service operations?
- How can food producers communicate with food consumers?

**Leadership**
- What actions should we take to ensure the safety of food from farm-to-table?
- How do we know if we are achieving goals related to the flow of food in food-service operations?

**Management**
- What resources are needed to ensure food safety from farm-to-table?
- What criteria are in place to ensure food safety?

**National Standards for Family and Consumer Sciences Education**
9.2 Apply risk management procedures to food safety, food testing, and sanitation.

**FCCLA National Programs and Competitive Events**

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- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

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- Advocate

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- Professional Presentation
- Public Policy Advocate
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**The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards**

**FPP.03.02.** Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

**FPP.03.03.** Create food distribution plans and procedures to ensure safe delivery of food products.

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**Task Number 55**

**Analyze risk factors and points of vulnerability in the food supply continuum, from source to production to distributor.**

**Definition**
Analysis should include
• defining standards, procedures, and controls for a secure food supply (e.g., HACCP, ServSafe)
• defining various sources in the food supply
• defining the risk factors for contamination
• identifying situations that may lead to a food recall.

Process/Skill Questions

Thinking

• What procedures are needed to analyze risk factors and points of vulnerability in the food supply continuum, from source to production to distributor?
• What criteria can be used to analyze risk factors and points of vulnerability in the food supply continuum?

Communication

• What questions need to be answered in order to reduce risk factors and points of vulnerability in the food supply continuum?
• What are the consequences of not communicating the risk factors and points of vulnerability in the food supply continuum?

Leadership

• What should be done to facilitate the reduction of risk factors and points of vulnerability in the food supply continuum?
• How do we know if we are achieving goals related to risk factors and points of vulnerability in the food supply continuum?

Management

• What criteria are needed to analyze risk factors and points of vulnerability in the food supply continuum?
• What might be the consequences of not identifying risk factors and points of vulnerability in the food supply continuum?

National Standards for Family and Consumer Sciences Education

9.2 Apply risk management procedures to food safety, food testing, and sanitation.

FCCLA National Programs and Competitive Events

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

STAND Up
• Assess
• Educate
• Advocate

Competitive Event—STAR Events
• Professional Presentation
• Public Policy Advocate
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.01.02. Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.

FPP.01.03. Apply food safety procedures when storing food products to ensure food quality.

FPP.04.01. Examine the scope of the food industry by evaluating local and global policies, trends, and customs for food production.

Task Number 56

Identify the regulatory agencies and their primary roles, from food production through consumption.

Definition

Identification should include

• federal agencies (e.g., U.S. Department of Agriculture [USDA], FDA, Centers for Disease Control and Prevention [CDC], USDA Food Safety and Inspection Service [FSIS]) that regulate and implement food safety requirements
• local agencies (e.g., county health departments,) that monitor compliance
• state agencies (e.g., Virginia Department of Health)
• criteria agencies use to protect food and the effectiveness of those criteria
• labeling laws and public information dissemination.

Process/Skill Questions

Thinking

• What is the food inspection process?
• Which federal, state, and local regulatory agencies are involved in food protection?

Communication

• What do we need to know in order to understand the relationship among the federal, state, and local regulatory agencies involved in food protection?
• How can we ensure compliance with the regulations for food protection?

Leadership

• How do we implement procedures to ensure food protection?
• How do we know if we are achieving goals related to food protection?

Management

• What steps do we need to take to ensure food protection?
• What resources are needed to ensure food protection?

National Standards for Family and Consumer Sciences Education

9.2 Apply risk management procedures to food safety, food testing, and sanitation.
FCCLA National Programs and Competitive Events

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Competitive Event--STAR Events

- Career Investigation
- Food Innovations
- Professional Presentation
- Public Policy Advocate
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.04.03. Identify and explain the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems.

Task Number 57

Analyze risk factors that contribute to foodborne illnesses.

Definition

Analysis should include

- describing the factors often referred to as FAT TOM (food, acidity, time, temperature, oxygen, moisture)
- listing foodborne illnesses and their causes and associated pathogens
- identifying examples and sources of food intoxication and food infection
- discussing food safety and sanitation practices.

Process/Skill Questions

Thinking

- How would you describe FAT TOM?
- What procedures are needed to prevent foodborne illness?

Communication

- How can we ensure food safety?
- How do we communicate the risk factors for foodborne illnesses to employees?
Leadership

- What actions should employees take to reduce risk factors that contribute to foodborne illnesses?
- What guidelines promote the reduction of risk factors that contribute to foodborne illnesses?

Management

- What resources help reduce risk factors that contribute to foodborne illnesses?
- What actions can individuals take to analyze risk factors that contribute to foodborne illnesses?

National Standards for Family and Consumer Sciences Education

9.2 Apply risk management procedures to food safety, food testing, and sanitation.

FCCLA National Programs and Competitive Events

Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Competitive Event--STAR Events

- Food Innovations
- National Programs in Action
- Professional Presentation
- Public Policy Advocate
- Check the national website for on-line events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.01.02. Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.
Task Number 58

Describe methods for managing food allergens in a food system.

Definition
Description should include
- comparing and contrasting an allergen, food sensitivity, and food intolerance
- identifying points along the flow of food where cross contact can occur.

Process/Skill Questions
Thinking
- How can food allergens be managed?
- How are food allergens transferred in the food-service environment?
- What are the eight foods identified as responsible for 90 percent of food allergic reactions?

Communication
- What body systems are affected by food allergies?
- Who would the consumer contact if they felt a violation has taken place?

Leadership
- Which department in the government is responsible for compliance of control methods?

Management
- What training is required of personnel?
- Who is responsible for that training?
- What are proper control procedures?

National Standards for Family and Consumer Sciences Education
9.2 Apply risk management procedures to food safety, food testing, and sanitation.

FCCLA National Programs and Competitive Events
Families First
- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One
- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up
- Assess
- Educate
- Advocate

Competitive Event--STAR Events
Task Number 59

Identify the process of responding to foodborne illnesses and outbreaks.

Definition

Identification should include

- providing evidence of a foodborne illness
- reporting a foodborne illness
- initiating a food traceback.

Process/Skill Questions

Thinking

- What procedures are needed to respond to foodborne illnesses?
- Why is it important to identify foodborne illnesses?
- What guidelines should be used to identify the food responsible for an outbreak?

Communication

- What questions need to be answered in order to respond to foodborne illnesses?
- What do we need to understand about responding to a foodborne illness?

Leadership

- What actions need to be taken to respond to foodborne illness?
- What guidelines outline the process of responding to foodborne illnesses?

Management

- What resources are available to support the process of responding to foodborne illnesses?
- What is the consequence of failing to respond to foodborne illnesses?

National Standards for Family and Consumer Sciences Education

9.2 Apply risk management procedures to food safety, food testing, and sanitation.

FCCLA National Programs and Competitive Events

Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One

- A Better You
- Family Ties
The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.01.02. Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.

Task Number 60

Demonstrate Hazard Analysis Critical Control Point (HACCP) implementation.

Definition

Demonstration should include

- explaining ways that the HACCP system helps food-service establishments maintain safe food handling through the flow of goods
- identifying foods and procedures that are potential causes of foodborne illnesses
- developing facility procedures that will reduce the risk of foodborne illnesses
- monitoring procedures in order to keep food safe
- developing a system of recordkeeping to ensure food safety.

Process/Skill Questions

Thinking

- What procedures are needed to ensure food safety and sanitation?
- What factors affect decisions in evaluating food safety and sanitation procedures?
- What choices should we advocate for individuals, families, and society when evaluating food safety, food testing, and sanitation procedures to meet health and safety requirements?

Communication

- How can we effectively communicate risk management procedures?
- How can we ensure that procedures are clearly understood by everyone involved in food safety, food testing, and sanitation?
- What are the consequences of not communicating food safety, food testing, and sanitation procedures to employees?
Leadership

- How can we set goals to follow food safety, food testing, and sanitation procedures?
- What actions should we take to guarantee food safety, food testing, and sanitation procedures follow the required guidelines?
- How can we facilitate food safety, food testing, and sanitation procedures in the workplace?
- What happens when food safety, food testing, and sanitation practices are effectively followed?

Management

- What steps do we need to take to ensure proper food safety, food testing, and sanitation procedures are followed?
- What criteria are needed to develop a plan for following food safety, food tasting, and sanitation procedures?
- What might be the consequences of safety and sanitation procedures on the individual, the family, and society?

National Standards for Family and Consumer Sciences Education

9.2 Apply risk management procedures to food safety, food testing, and sanitation.

FCCLA National Programs and Competitive Events

Career Connection

- My Skills
- My Life
- My Career
- My Plan

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Competitive Event--STAR Events

- National Programs in Action
- Professional Presentation
- Public Policy Advocate
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.01.02. Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.

FPP.04.03. Identify and explain the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems.
Task Number 61

Demonstrate practices and procedures that assure personal and workplace health and hygiene.

Definition
Demonstration should include

- application of basic ServSafe principles with regard to the temperature danger zone
- proper hand-washing procedures
- first-in, first-out (FIFO) method
- proper storage procedures
- proper flow of food to maintain food safety
- cleaning and sanitization of food-contact surfaces
- disinfection of food-contact surfaces
- personal hygiene
- ware-washing procedures.

Process/Skill Questions

Thinking

- What are the basic concepts of personal hygiene?
- Why is it important to stay updated on the new CDC requirements related to COVID-19?
- What procedures are needed to assure personal and workplace hygiene?
- What is the difference between sanitation and disinfection?
- What is the definition of cross contact?
- What is the difference between cross contact and cross contamination?

Communication

- What do employees need to know in order to understand the relationship between personal and workplace health and food safety?
- What practices and procedures assure personal and workplace health and hygiene?

Leadership

- How can employers facilitate practices and procedures that assure personal and workplace health and hygiene?
- What guidelines promote food safety?

Management

- What resources are needed to assure personal and workplace health and hygiene?
- What actions can individuals take to evaluate their personal and workplace health and hygiene?
- When should an employee stay home due to illness?
- What are the five steps that must be taken to prevent cross contact?

National Standards for Family and Consumer Sciences Education

9.2 Apply risk management procedures to food safety, food testing, and sanitation.

9.2.4 Use the Hazard Analysis Critical Control Point (HACCP) during all food handling processes (the flow of food) to minimize the risks of food borne illness.
FCCLA National Programs and Competitive Events

Career Connection
- My Skills
- My Life
- My Career
- My Plan

Families First
- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One
- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up
- Assess
- Educate
- Advocate

Student Body
- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event—STAR Events
- Baking and Pastry
- Event Management
- Food Innovations
- Hospitality, Tourism and Recreation
- National Programs in Action
- Professional Presentation
- Public Policy Advocate
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.01.02. Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.

FPP.02.03. Apply principles of human behavior to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.
Task Number 62

Perform a safety evaluation based on OSHA regulations.

Definition
Performance should include

- analysis of workplace hazards
- completion of documentation (e.g., incident reports, complaint procedures)
- listing of corrective action for potential hazards.

Process/Skill Questions

Thinking

- How would you describe OSHA’s criteria for a safety evaluation?
- What procedures are needed to perform an OSHA safety evaluation?
- What are the OSHA safety standards?
- What are OSHA’s five major components of an effective safety and health program?

Communication

- What questions should be answered during the OSHA safety evaluation?
- How can employers ensure that employees follow the procedures for a safety evaluation?

Leadership

- What strategies would reduce workplace hazards?
- What should be done to facilitate documentation (e.g., incident reports, complaint procedures)?

Management

- What resources are needed to complete an OSHA safety evaluation?
- How is a safety program evaluated?
- What actions can individuals take to evaluate the outcomes of an OSHA safety evaluation?
- Who is responsible for seeing that OSHA standards are followed?

National Standards for Family and Consumer Sciences Education

9.2.8 Use Occupational Safety and Health Administration's (OSHA) Right to Know Law and Material Safety Data Sheets (MSDS), and explain their requirements in handling hazardous materials.

FCCLA National Programs and Competitive Events

Career Connection

- My Skills
- My Life
- My Career
- My Plan

Power of One

- A Better You
- Family Ties
- Working on Working
• Take the Lead
• Speak out for FCCLA

STAND Up

• Assess
• Educate
• Advocate

Competitive Event--STAR Events

• Baking and Pastry
• Career Investigation
• Culinary Arts
• Entrepreneurship
• Event Management
• Food Innovations
• Hospitality, Tourism and Recreation
• National Programs in Action
• Professional Presentation
• Public Policy Advocate
• Check the national website for on line events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.01.01. Analyze and manage operational and safety procedures in food products and processing facilities.

FPP.04.02. Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.

Exploring Diet and Nutrition Fundamentals

Task Number 63

Apply basic concepts of human nutrition.

Definition

Application should include

• explaining the function of nutrients
• creating a balanced diet based on nutritional needs
• tracing the digestive process (e.g., breakdown of enzymes, food assimilation, relationship of the endocrine system to enzymes).

Process/Skill Questions

Thinking

• What contextual factors should be considered when evaluating nutrition information?
• What factors affect decisions about preparing and serving foods to meet nutritional needs of individuals and families across the life span?
• What are the consequences for the well-being of the individual, families, and societies when foods are not prepared and served to meet nutritional needs?
• How might a lack of nutrients lead to digestive issues and negative health consequences?
Communication

- What do we do about understanding and evaluating nutritional information?
- How do we communicate nutritional information to others?
- How should we communicate to enhance the evaluation of nutritional information?

Leadership

- What skills do we need to relay to others to promote the evaluation of nutritional information?
- What guidelines promote evaluation of nutritional information?
- What actions can we create that meet our goals and standards for evaluating nutritional information?

Management

- What resources aid in evaluating nutritional information?
- What resources are available that might help us prepare and serve food to meet nutritional needs of individuals and families?
- What actions can individuals and society take to evaluate nutrition information to promote optimal wellness?

National Standards for Family and Consumer Sciences Education

9.4 Apply basic concepts of nutrition and nutritional therapy in a variety of settings.

FCCLA National Programs and Competitive Events

Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event--STAR Events

- Focus on Children
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Sports Nutrition
- Check the national website for online events
- Check the website for Skill Events
The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.

Task Number 64

Explain nutritional guidelines.

Definition

Explanation should include

- identifying recommended Daily Values (DV)
- identifying ideal percentage of nutrient intake (see Nutritional Goals for Age-Sex Groups Based on Dietary Reference Intakes and Dietary Guidelines Recommendations)
- differentiating between the Recommended Daily Intake (RDI) and Recommended Dietary Allowance (RDA)
- distinguishing between serving size and portion
- describing various eating patterns, according to USDA guidelines.

Process/Skill Questions

Thinking

- What factors affect decisions about consuming nutrient-dense food and beverages?
- What resources are needed to maintain calorie balance and sustain a healthy weight?

Communication

- How can we effectively communicate the recommended dietary guidelines to clients?
- What do we need to understand about implementing the recommended dietary guidelines?

Leadership

- What guidelines promote healthy lifestyles?
- What skills are needed to analyze a personal diet, using ChooseMyPlate.gov?

Management

- What steps are needed to explain nutritional guidelines and labels?
- What might be the effect on personal health if individuals apply nutritional guidelines?

National Standards for Family and Consumer Sciences Education

9.4 Apply basic concepts of nutrition and nutritional therapy in a variety of settings.

FCCLA National Programs and Competitive Events

Community Service

- Learn
- Serve
- Lead

Families First

- Families Today
- You Me Us
• Meet the Challenge
• Balancing Family & Career
• Parent Practice

**Power of One**
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

**STAND Up**
• Assess
• Educate
• Advocate

**Student Body**
• The Healthy You
• The Fit You
• The Real You
• The Resilient You

**Competitive Event--STAR Events**
• Baking and Pastry
• Focus on Children
• Food Innovations
• National Programs in Action
• Nutrition and Wellness
• Professional Presentation
• Sports Nutrition
• Teach and Train
• Check the national website for online events
• Check the website for Skill Events

**The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards**

**FPP.02.01.** 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.

**FPP.02.03.** Apply principles of human behavior to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.

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**Task Number 65**

**Describe factors affecting a person’s food preferences.**

**Definition**
Description should include

• lifestyle preferences
• geographic location (e.g., food availability, food access)
• religious preferences
• family customs
• food product marketing
• food fads and fad diets.
Process/Skill Questions

Thinking

- What factors influence a person’s food preferences?
- Why is it important to research an individual’s food preferences?
- Why is it important to research food fads and fad diets?

Communication

- What do we need to know in order to understand the relationship between healthy eating and individual food preferences?
- What communication skills are needed to encourage healthy food preferences?
- What ethnic and cultural values influence individual food preferences?

Leadership

- What strategies would bring about change in an individual’s food preferences?
- What actions promote healthy food preferences?

Management

- What resources are needed to promote healthy food preferences?
- What actions can individuals take to evaluate their food preferences?

National Standards for Family and Consumer Sciences Education

9.5.1 Analyze various factors that affect food preferences in the marketing of food.

FCCLA National Programs and Competitive Events

Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

Competitive Event--STAR Events

- Focus on Children
- Food Innovations
- Hospitality, Tourism and Recreation
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Sports Nutrition
- Teach and Train
- Check the national website for online events
- Check the website for Skill Events
Task Number 66

Describe food security with regard to food access (e.g., local, state, national, international).

Definition

Description should include

- definition of *food security* with regard to the lack of available resources to obtain food (e.g., money, availability, socio-cultural factors)
- definition of *food access* with regard to the availability of resources to obtain healthy foods (e.g., financial resources, prices, region, socio-economic and cultural factors, transportation, food banks)
- identification of influential economic factors such as globalization of food (i.e., importing and exporting of food products), industrialization, use of technology, government subsidies for food production, price controls, food supply, and food distribution
- how these economic factors influence consumers’ food choices and other nutritional practices
- identification of influential environmental factors such as soil and air quality, climate, practices to reduce food waste, practices to conserve energy and other resources, and practices to protect the environment
- explanation of how these environmental factors influence consumers’ food choices and other nutritional practices.

Process/Skill Questions

**Thinking**

- What is the difference between food safety and food security?
- What factors affect food security and safety?
- What factors affect food access?

**Communication**

- How can we understand and evaluate food security?
- What questions need to be answered in order to reduce food insecurity?

**Leadership**

- How can leaders reduce food insecurity?
- What factors influence consumers’ food choices and other nutritional practices?

**Management**

- What resources would increase food security?
- What are the consequences of food insecurity?
National Standards for Family and Consumer Sciences Education

9.3.4 Assess the influence of cultural, socioeconomic and psychological factors on food and nutrition and behavior.

FCCLA National Programs and Competitive Events

Community Service

- Learn
- Serve
- Lead

Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Financial Fitness

- Earning
- Spending
- Saving
- Protecting

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Competitive Event--STAR Events

- Entrepreneurship
- Event Management
- Focus on Children
- Food Innovations
- Hospitality, Tourism and Recreation
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Public Policy Advocate
- Sustainability Challenge
- Teach and Train
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.03.03. Create food distribution plans and procedures to ensure safe delivery of food products.
Task Number 67

Compare nutrient requirements across the life span.

Definition
Comparison should include the nutritional needs at the following stages of life:

- Newborn/infant (first year)
- Young childhood (1-6)
- Middle childhood (6-12)
- Adolescence (12-18)
- Early adulthood (18-30)
- Pregnancy
- Middle age (30-60)
- Older adulthood (over 60)

Comparison should also include the additional nutritional needs of persons at each stage of life according to various levels of physical activity.

Process/Skill Questions

Thinking
- What factors determine nutritional needs at various stages of life?
- What nutrition-related problems may arise at different stages of life?

Communication
- How can we understand and evaluate nutritional needs throughout the life span?
- What do we need to know in order to understand the relationship between lifestyle and health/wellness across the life span?

Leadership
- What strategies would bring about positive change in lifestyle for family members?
- What guidelines promote healthy lifestyles across the life span?

Management
- What steps should family members take to establish goals to meet the nutritional needs of family members at different stages of life?
- What resources impact a family’s ability to meet the nutritional needs of family members?

National Standards for Family and Consumer Sciences Education
9.3.1 Analyze nutrient requirements across the life span, addressing the diversity of people, cultures, and religions.
9.4 Apply basic concepts of nutrition and nutritional therapy in a variety of settings.

FCCLA National Programs and Competitive Events

Community Service
- Learn
- Serve
- Lead
Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event--STAR Events

- Focus on Children
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Sports Nutrition
- Teach and Train
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.

Task Number 68

Apply basic concepts of nutrition for meeting special dietary needs.

Definition

Application should include

- explaining the basic concepts of nutrition
- reviewing the USDA nutrition guidelines
- evaluating specific diet and menu plans to meet each identified need.
Process/Skill Questions

Thinking

- What are the basic concepts of nutritional therapy?
- What should be accomplished when implementing nutritional therapy?
- What beliefs, actions, or conditions prevent the application of the basic concepts of nutritional therapy?

Communication

- What communication skills do we need to use to convey basic concepts of nutritional therapy?
- What questions do we ask in order to clarify the meaning of nutritional therapy?
- In what ways does the use of communication contribute to the analysis of basic concepts of nutritional therapy?

Leadership

- What skills do we need to relate to others for health maintenance and disease prevention?
- What goals promote skills in nutrition counseling?
- How do contradictions and inaccuracies affect the success of nutrition therapy?

Management

- What resources impact basic concepts of nutritional therapy?
- What standards exist in nutrition counseling?
- What actions can individuals, families, and society take to promote optimal health and disease prevention?

National Standards for Family and Consumer Sciences Education

9.4 Apply basic concepts of nutrition and nutritional therapy in a variety of settings.

FCCLA National Programs and Competitive Events

Community Service

- Learn
- Serve
- Lead

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND UP

- Assess
- Educate
- Advocate

Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You
Competitive Event--STAR Events

- Culinary Arts
- Focus on Children
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Public Policy Advocate
- Sports Nutrition
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.

Applying Nutritional and Dietary Requirements

Task Number 69

Identify food guidelines for various populations with special dietary needs.

Definition

Identification should include

- describing the specific dietary modifications required to meet the dietary needs of various populations, such as
  - athletes
  - vegetarians and vegans
  - persons with religious considerations
  - pregnant and/or lactating females.

Process/Skill Questions

Thinking

- What factors will affect decisions about food guidelines for various populations?
- What criteria are used for identifying food guidelines for various populations?

Communication

- What questions need to be answered in order to identify food guidelines for various populations?
- How do we communicate food guidelines for various populations to the client?

Leadership

- How are food guidelines implemented for various populations?
- How do we know if we are achieving these goals?
Management

- What resources are needed to implement food guidelines for various populations?
- What criteria help identify food guidelines for various populations?

National Standards for Family and Consumer Sciences Education

9.3 Evaluate nutrition principles, food plans, preparation techniques, and specialized dietary plans.
9.4 Apply basic concepts of nutrition and nutritional therapy in a variety of settings.

FCCLA National Programs and Competitive Events

Community Service

- Learn
- Serve
- Lead

Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event–STAR Events

- Focus on Children
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Sports Nutrition
- Check the national website for online events
- Check the website for Skill Events
The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.

Task Number 70

Identify nutritional guidelines for persons with chronic health conditions.

Definition

Identification includes describing the specific dietary modifications required to meet the dietary needs of each of the following:

- Food allergies, intolerances, and insensitivities
- High cholesterol
- Diabetes (including glucose intolerance, prediabetes)
- Celiac disease (autoimmune reaction to gluten)
- Gastroesophageal reflux disease (GERD)
- Heart disease
- Cancer

Process/Skill Questions

Thinking

- What factors affect decisions about nutritional guidelines for persons with chronic health conditions?
- What are nutritional guidelines for persons with chronic health conditions?

Communication

- What questions need to be answered in order to identify nutritional guidelines for persons with chronic health conditions?
- How do we communicate the importance of nutritional guidelines for persons with chronic health conditions?

Leadership

- What should be done to facilitate the implementation of food guidelines for persons with chronic health conditions?
- How do we know if we are achieving goals related to the nutrition of persons with chronic health conditions?

Management

- What resources are needed to implement nutritional guidelines for persons with chronic health conditions?
- What criteria are needed to identify nutritional guidelines for persons with chronic health conditions?

National Standards for Family and Consumer Sciences Education

9.3 Evaluate nutrition principles, food plans, preparation techniques, and specialized dietary plans.
9.4 Apply basic concepts of nutrition and nutritional therapy in a variety of settings.

**FCCLA National Programs and Competitive Events**

**Community Service**
- Learn
- Serve
- Lead

**Families First**
- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

**Power of One**
- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

**STAND Up**
- Assess
- Educate
- Advocate

**Student Body**
- The Healthy You
- The Fit You
- The Real You
- The Resilient You

**Competitive Event—STAR Events**
- Focus on Children
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Public Policy Advocate
- Check the national website for online events
- Check the website for Skill Events

**Task Number 71**

**Interpret food-, nutrition-, and menu-labeling guidelines.**

**Definition**

Interpretation should include
- examining a variety of package labels to identify
  - nutrition information (i.e., nutrients, amount of each nutrient, percentage of minimum daily requirement for each nutrient)
  - ingredients
serving size and number of servings per package
health claims
expiration, sell-by, and use-by dates
storage instructions
applying nutrient composition information to make decisions
selecting a product that meets USDA dietary guidelines.

Process/Skill Questions

Thinking

- How does cost affect the ingredients and quality of a product?
- What information found on food labels is most helpful to the consumer? Why?
- How can this information be used when purchasing food?

Communication

- How do consumers benefit from information on food labels?
- What do we need to know about nutrient density?

Leadership

- How can the information on a food label be used to implement the dietary guidelines for Americans?
- What actions can consumers take to influence the content of food product labels?

Management

- How can food product labels help consumers eat more nutritiously?
- How can food product labels help consumers with the responsibility of planning nutritious meals?

National Standards for Family and Consumer Sciences Education

9.3.6 Critique the selection of foods to promote a healthy lifestyle.
9.4.2 Use nutritional information to support care planning.

FCCLA National Programs and Competitive Events

Community Service

- Learn
- Serve
- Lead

Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA
STAND Up

- Assess
- Educate
- Advocate

Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event--STAR Events

- Culinary Arts
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Public Policy Advocate
- Sports Nutrition
- Sustainability Challenge
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.03.01. Implement selection, evaluation, and inspection techniques to ensure safe and quality food products.

Task Number 72

Assess the nutritional composition of meals.

Definition

Assessment should include

- caloric content
- personal food intake
- consumer nutritional needs
- use of ChooseMyPlate.gov
- analysis of patient’s diet and personal characteristics (e.g., life span, activity level, chronic illnesses, lifestyle goals, budget limitations).

Process/Skill Questions

Thinking

- What are the daily caloric needs of the client?
- How do we evaluate the client’s diet and personal characteristics to identify the daily nutritional needs?

Communication

- What are reliable sources of nutritional information?
- What do we need to know in order to assess the nutritional composition of meals?
Leadership

- What actions should consumers take to assess the nutritional composition of meals?
- How do we know if we are accurately assessing the nutritional composition of meals?

Management

- What management skills can consumers use to ensure that the diet includes enough of the right nutrients?
- How does a consumer select foods that provide appropriate nutrients for all family members?

National Standards for Family and Consumer Sciences Education

9.3 Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
9.4.1 Analyze nutritional needs of individuals.
9.4.2 Use nutritional information to support care planning.
9.6.5 Manage amounts of food to meet needs of customers and clients.

FCCLA National Programs and Competitive Events

Families First
- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One
- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

Student Body
- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event--STAR Events
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.
Task Number 73

Modify a recipe based on nutritional needs.

Definition
Modification should include

- appropriate substitutions
- personal preferences
- taste, texture, cost, and nutritive value
- ingredient functions and properties
- recipe modifications
- dietary needs.

Process/Skill Questions
Thinking
- What are the basic concepts of recipe modification for nutritional needs?
- What might be the consequences for not modifying recipes when family members have medical conditions?

Communication
- What skills do we need to evaluate and modify recipes to meet dietary needs?
- What do we do about understanding and evaluating recipe modification?

Leadership
- How can we facilitate recipe modification for nutritional needs?
- What actions can be implemented to meet the standards for recipe modification based on nutritional needs?

Management
- What resources are needed to modify recipes to meet dietary needs?
- What criteria should be used when modifying recipes for nutritional needs?

National Standards for Family and Consumer Sciences Education
9.4 Apply basic concepts of nutrition and nutritional therapy in a variety of settings.

FCCLA National Programs and Competitive Events
Families First
- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One
- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA
Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event--STAR Events

- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Sports Nutrition
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.

Task Number 74

Develop a daily menu based on a modified diet.

Definition

Development should include

- daily food intake
- client needs
- health maintenance and disease prevention
- budget and lifestyle preferences.

Process/Skill Questions

Thinking

- What are the benefits of nutritional therapy?
- How does nutritional therapy provide assistance for special dietary needs?
- What factors influence planning for a client who is a diabetic? Who has high cholesterol or high blood pressure?

Communication

- What do clients need to know in order to understand the relationship between nutrition and health/wellness?
- What communication skills should be used to explain a client’s modified diet?

Leadership

- What strategies can be used to promote healthy food choices?
- What resources are needed to make a modified diet appealing to the client?
Management

- What factors would a dietitian consider when creating a modified diet to meet a patient’s medical needs?
- What criteria are needed to develop a daily menu based on a modified diet?

National Standards for Family and Consumer Sciences Education

9.4 Apply basic concepts of nutrition and nutritional therapy in a variety of settings.

FCCLA National Programs and Competitive Events

Families First

- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

Student Body

- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event--STAR Events

- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Sports Nutrition
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.
Examining Food Processing, Preservation, and Packaging

Task Number 75

Outline the history of food preservation and processing.

**Definition**
Outline should include defining *food processing* and identifying methods of processing food such as

- smoking
- salting
- sugar curing
- drying
- canning
- treating with nitrates and carbon dioxide
- freezing
- heating
- fermenting (food and beverage)
- pickling (use of oil and vinegar with fruits, vegetables, and meats).

**Process/Skill Questions**

**Thinking**

- Prior to refrigeration, how did people manage to preserve and/or package foods for extended use?
- How do the methods for preserving foods through the use of heat (e.g., vacuum packaging, reduced oxygen packaging [ROP]) compare with one another?
- What are the differences between canning and heat pasteurization?
- What are the major causes for nutrient loss in food preservation?
- How might one prevent nutrient loss during the preservation process?

**Communication**

- What do consumers need to know to evaluate food preservation and processing methods?
- What questions need to be answered in order to select the appropriate food preservation or processing method?

**Leadership**

- What skills and resources are needed for food preservation or processing?
- What criteria can be used for food preservation or processing?

**Management**

- What should the standards be in food preservation or processing?
- What resources impact food preservation or processing?

**FCCLA National Programs and Competitive Events**

**Families First**
- Families Today
- You Me Us
• Meet the Challenge
• Balancing Family & Career
• Parent Practice

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Competitive Event--STAR Events
• Food Innovations
• Nutrition and Wellness
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.03.02. Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

Task Number 76

Examine the role of additives in processed foods.

Definition
Examination should include

• food acids
• acidity regulators
• anticaking agents
• antifoaming agents
• antioxidants
• bulking agents
• food coloring
• emulsifiers
• flavors
• flour treatment agents
• humectants
• preservatives
• stabilizers
• sweeteners
• thickeners.

Process/Skill Questions

Thinking

• What are common food additives and their properties?
• What thickening agents are used in food processing?

Communication
• What do consumers need to know about the relationship among chemical and physical properties of foods and their influences on nutritional value and eating quality?
• What questions should consumers ask to understand common food additives?

Leadership

• What strategies would bring about changes in the use of food additives?
• What guidelines promote the safe use of food additives?

Management

• What standards should be used to engineer new food items?
• How do food products and processing facilities use biochemistry concepts to develop new food products?

National Standards for Family and Consumer Sciences Education

9.7.1 Explain the properties of elements, compounds, and mixtures in foods and food products.

FCCLA National Programs and Competitive Events

Families First

• Families Today
• You Me Us
• Meet the Challenge
• Balancing Family & Career
• Parent Practice

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Student Body

• The Healthy You
• The Fit You
• The Real You
• The Resilient You

Competitive Event–STAR Events

• Food Innovations
• Nutrition and Wellness
• Professional Presentation
• Sports Nutrition
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.02. 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.
FPP.03.02. Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

Task Number 77

Describe procedures that affect product quality performance.

Definition
Description should include

- processing methods for various foods
- variables that must be controlled in order to produce a quality product.

Process/Skill Questions

Thinking

- What factors determine the processing methods for various foods?
- What is the difference between hot and cold processing?

Communication

- How does the USDA effectively communicate the quality and yield grade on food product labels?
- What information needs to be on the product label for the consumer to evaluate the quality of the product?

Leadership

- What are the procedures used to assign the quality and yield grades to products?
- What agencies regulate food product quality?

Management

- How does quality control impact a food-processing company’s operations?
- How does the care and raising of livestock for consumption affect quality and yield grades?

National Standards for Family and Consumer Sciences Education

9.7 Demonstrate principles of food biology and chemistry.

FCCLA National Programs and Competitive Events

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- Parent Practice

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Student Body

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• The Fit You
• The Real You
• The Resilient You

Competitive Event—STAR Events

• Food Innovations
• National Programs in Action
• Nutrition and Wellness
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.02. 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.

FPP.03.02. Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

Task Number 78

Describe units of operation in food processing and preservation.

Definition

Description should include

• fluid and flow energy
• heat transfer
• drying
• evaporation.

Process/Skill Questions

Thinking

• Why and how are foods processed?
• Who benefits from food processing?
• How do practices in the food processing industry affect food, people, and the environment?

Communication

• What do we need to know in order to understand the relationship between units of operation and food processing and preservation?
• How do we know that appropriate processing and preservation techniques are used for a specific food product?

Leadership

• What are the duties of food scientists?
• What equipment is needed for the units of operation in food processing and preservation?

Management
• How do resources impact food processing and preservation?
• How does the method of preservation affect the physical characteristics of the food product?

National Standards for Family and Consumer Sciences Education
9.7 Demonstrate principles of food biology and chemistry.

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Families First
• Families Today
• You Me Us
• Meet the Challenge
• Balancing Family & Career
• Parent Practice

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Student Body
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• The Fit You
• The Real You
• The Resilient You

Competitive Event--STAR Events
• Food Innovations
• National Programs in Action
• Nutrition and Wellness
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards
FPP.02.02. 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.
FPP.03.03. Create food distribution plans and procedures to ensure safe delivery of food products.

Task Number 79

Examine the principles of fermentation.

Definition
Examination should include types of fermented foods such as
• bean-based (e.g., miso, soy sauce, stinky tofu, tempeh, soybean paste)
• dough-based
• grain-based
• vegetable-based (e.g., Kimchi, mixed pickle, sauerkraut, Indian pickle, gundruk)
• fruit-based
• honey-based (e.g., mead)
• dairy-based
• fish-based
• meat-based.

Process/Skill Questions

Thinking

• What are the types of fermentation used in the beverage process?
• What are four different types of fermentation processes?
• How are food products changed by the process of fermentation?
• What are the side effects of fermentation that are related to health and disease?

Communication

• What do we need to know in order to understand the relationship between microbes and fermentation?
• How can we ensure food safety during the food management process?

Leadership

• How are fermented foods beneficial to consumers?
• What are the nutritional differences between fermented foods and their original food sources?

Management

• What considerations should be taken into account when fermenting products?
• What might be the impact of fermented foods on an individual’s health?

National Standards for Family and Consumer Sciences Education

9.7 Demonstrate principles of food biology and chemistry.

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Families First

• Families Today
• You Me Us
• Meet the Challenge
• Balancing Family & Career
• Parent Practice

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Student Body

• The Healthy You
The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.02. 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.

Task Number 80

Implement food preparation, production, and testing systems.

Definition
Implementation should include

- standards of quality control
- clean-in-place methods
- corrosion-resistant materials
- HACCP plan.

Process/Skill Questions

Thinking

- Why is it important to have a HACCP plan in place in a food production facility?
- What are some potentially hazardous foods?

Communication

- What are the characteristics of proper finishing materials where food is processed?
- What do employees need to know in order to understand the relationship between the HACCP plan and food safety?

Leadership

- What are the steps to sanitize a non-porous surface?
- What skills are needed to implement an HACCP plan in a food production facility?

Management

- What are the standards for implementing an HACCP plan in a food production facility?
- What resources are needed to implement an HACCP plan in a food production facility?

National Standards for Family and Consumer Sciences Education

9.2 Apply risk management procedures to food safety, food testing, and sanitation.
9.2.4 Use the Hazard Analysis Critical Control Point (HACCP) during all food handling processes to minimize the risks of food borne illness.

9.5 Demonstrate use of science and technology advancements in food product development and marketing.

9.6 Demonstrate food science, dietetics, and nutrition management principles and practices.

**FCCLA National Programs and Competitive Events**

**Career Connection**
- My Skills
- My Life
- My Career
- My Plan

**Families First**
- Families Today
- You Me Us
- Meet the Challenge
- Balancing Family & Career
- Parent Practice

**Power of One**
- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

**Competitive Event—STAR Events**
- Culinary Arts
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Check the national website for online events
- Check the website for Skill Events

**The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards**

FPP.01.01. Analyze and manage operational and safety procedures in food products and processing facilities.

**Task Number 81**

Analyze packaging materials with regard to types, functions, and environmental factors.

**Definition**

Analysis should include

- glass
- metal
- aluminum
• plastic
• paper
• kraft paper
• sulfite paper
• grease-proof paper
• parchment
• paperboard.

Process/Skill Questions

Thinking
• What packaging materials are popular on store shelves? Why?
• Why might a manufacturer select a given type of packaging?
• How do manufacturers make food packaging tamper resistant?

Communication
• What are the various packaging materials and their uses?
• Why are some packaging methods better for certain types of food than others?
• What types of food products are normally found in metal packaging? Why?

Leadership
• What actions should consumers take to promote package sustainability?
• What guidelines promote sustainable product packaging?

Management
• What resources may encourage consumers to use sustainable packaging?
• What are the consequences of using different types of packaging (e.g., glass, metal, aluminum, paper)?

National Standards for Family and Consumer Sciences Education
9.5 Demonstrate use of current technology in food product development and marketing.

FCCLA National Programs and Competitive Events

Career Connection
• My Skills
• My Life
• My Career
• My Plan

Families First
• Families Today
• You Me Us
• Meet the Challenge
• Balancing Family & Career
• Parent Practice

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA
Competitive Event--STAR Events

- Food Innovations
- Professional Presentation
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.03.02. Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

Task Number 82

Explore how different packaging affects food/nutrient quality.

Definition
Description should include the determining factors for selecting materials used in packaging to enhance nutritional value.

Process/Skill Questions

Thinking
- Why is safe packaging important?
- Why is it important to physically protect packaged food?

Communication
- What governmental agencies are involved in regulating food and nutrient quality in packaged foods?
- What are the differences among chemical, biological, and physical external influences?
- How should proper packaging methods be selected based on the external influences of chemical, biological, and physical contaminations?
- Why are the best packaging methods based on the external influences of chemical, biological, and physical contaminations?

Leadership
- Which government agency regulates packaging materials
- What are the differences in the types of paper used in packaging?

Management
- What are the determining factors in the selection process of materials for packaging that ensure optimum nutritional value?
- What might be the impact of various types of packaging on food and nutrient quality?
- What criteria are needed to select packaging that preserves food and nutrient quality?

National Standards for Family and Consumer Sciences Education
9.5 Demonstrate use of current technology in food product development and marketing.

FCCLA National Programs and Competitive Events

Career Connection
Examining Product Development

Task Number 83

Review the history of food processing and product development.

Definition

Review should include

- creating a timeline of the history of food processing
- researching historically significant food scientists and their influence on the food industry in the United States
- describing the processes and how products came to be developed
- providing example products
- analyzing the impact of historical food processing on current practices
- explaining the benefits to businesses and consumers.

Process/Skill Questions

Thinking

- Why is it important to understand the history of food processing?
• What trends do we see developing in the food-processing industry today?

Communication
• How has marketing influenced the evolution and development of food products?
• How has product development changed consumer decisions and tastes?
• What are the advantages and disadvantages of food processing?

Leadership
• How does cooperation among the product team members contribute to the quality of the food product?
• What resources can we use to learn about the early days of food processing?
• What is your role/responsibility in preserving the history and traditions of food processing for future generations?

Management
• Why does management have a responsibility to be aware of trends in the industry?
• How can management look to traditional food-processing methods in the product-development process?

National Standards for Family and Consumer Sciences Education
9.5 Demonstrate use of current technology in food product development and marketing.

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Career Connection
• My Skills
• My Life
• My Career
• My Plan

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Competitive Event--STAR Events
• Career Investigation
• Food Innovations
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards
FPP.04.02. Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.
Task Number 84

Identify the need for food product development.

Definition
Identification should include

- distinguishing target audiences
- determining the needs of target audiences
- analyzing technical viability of the product
- identifying possible competitive products currently available in the marketplace
- explaining market opportunities available for the proposed product.

Process/Skill Questions

Thinking

- What contextual factors might affect food preferences? How might these factors be interpreted to aid in food product development?
- What are the possible consequences (positive and negative) of food product development on the individual? Families? Community?
- How can packaging fulfill both a functional and marketing purpose?

Communication

- What do we need to know in order to understand the relationship between current technology and product development? How can we utilize this data to enhance food product development?
- How does communication contribute to successful food product development?

Leadership

- What skills do we need to successfully apply technology in food product development?
- What should be done to facilitate the implementation of procedures to ensure successful food product development?
- How do we know if we are achieving goals related to food product development?

Management

- What resources are needed to manage technology used in food product development?
- What criteria should be developed to examine the impact of current technology on food product development?
- What are the consequences of using technology in food product development? For individuals? Families? Employees? Company?

National Standards for Family and Consumer Sciences Education

9.5 Demonstrate use of current technology in food product development and marketing.

FCCLA National Programs and Competitive Events

Career Connection

- My Skills
- My Life
- My Career
- My Plan

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

**Competitive Event—STAR Events**

• Career Investigation
• Food Innovations
• Hospitality, Tourism and Recreation
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

**The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards**

**FPP.02.03.** Apply principles of human behavior to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.

**FPP.04.01.** Examine the scope of the food industry by evaluating local and global policies, trends, and customs for food production.

**FPP.04.02.** Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.

**Task Number 85**

**Review the process for food product development.**

**Definition**

Review should include

- describing stages of the process
- illustrating the process
- determining advantages of implementing the process.

**Process/Skill Questions**

**Thinking**

- How can the process improve the quality of a food product?
- How can the process reduce the risk of product failure?

**Communication**

- What communications skills are necessary for success of the process?
- Why is it important to stop a poor product from passing through a step of the process?

**Leadership**

- What teamwork skills are required in the process?
- How does the process promote responsible decision-making skills?

**Management**

- How does the process promote time and resource management?
- What resources are available that might help us use the process?
• How long does it take to develop a new food product?

**National Standards for Family and Consumer Sciences Education**

9.5 Demonstrate use of current technology in food product development and marketing.

**FCCLA National Programs and Competitive Events**

**Career Connection**

• My Skills
• My Life
• My Career
• My Plan

**Power of One**

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

**Competitive Event—STAR Events**

• Career Investigation
• Food Innovations
• Hospitality, Tourism and Recreation
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

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FPP.04.02. Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.

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**Task Number 86**

**Analyze various marketing strategies that affect consumer food choices.**

**Definition**

Analysis should include

• describing marketing strategies used by food manufacturers
• describing the effects of marketing and labeling on food choices.

**Process/Skill Questions**

**Thinking**

• How can information on package labels help consumers make healthy choices?
• What are the consequences of not using label information when deciding whether to purchase a food item?

Communication

• What techniques are used in marketing to influence food product choice?
• How are companies responsible for accurate label information?
• Why is it important to provide accurate information?
• Who benefits from information on package labels?

Leadership

• Why do you think the federal government changes its requirements for nutrition labels?
• How can consumers influence the content of labels?

Management

• How do label guidelines and laws hold companies accountable for food product health and safety?
• What criteria are needed to evaluate nutritional labels?

National Standards for Family and Consumer Sciences Education

9.5.1 Analyze various factors that affect food preferences in the marketing of food.
9.5.2 Analyze data in statistical analysis in making development and marketing decisions.

FCCLA National Programs and Competitive Events

Career Connection

• My Skills
• My Life
• My Career
• My Plan

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Competitive Event--STAR Events

• Career Investigation
• Food Innovations
• Hospitality, Tourism and Recreation
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.04.02. Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.
Task Number 87

Explore consumer trends and how they impact the food industry and careers within it.

Definition
Exploration should include

- identifying current consumer trends
- providing examples of current trends
- analyzing the impact of trends on the food industry
- predicting how food trends may impact job availability in related careers.

Process/Skill Questions

Thinking
- What are the impacts of food-related trends on consumers? On society? On the food industry? On farmers? Are any of these impacts of food-related trends harmful? Why, or why not?
- What is the impact of controversial biotechnological developments in agriculture or production on the consumer?

Communication
- How can knowledge of current trends in the food industry help businesses succeed?
- What do consumers need to know about food trends?

Leadership
- What leadership skills may be necessary to develop a new product based on current food trends?
- How do leadership skills affect career success?

Management
- What types of jobs can be created by current food trends? How can food trends result in the loss of jobs?
- How can consumers evaluate food trends?

National Standards for Family and Consumer Sciences Education
9.5.2 Analyze data in statistical analysis in making development and marketing decisions.

FCCLA National Programs and Competitive Events

Career Connection
- My Skills
- My Life
- My Career
- My Plan

Power of One
- A Better You
- Family Ties
- Working on Working
- Take the Lead
• Speak out for FCCLA

**Competitive Event—STAR Events**

• Career Investigation
• Food Innovations
• Hospitality, Tourism and Recreation
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

**The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards**

**FPP.02.03.** Apply principles of human behavior to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.

**FPP.04.02.** Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.

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**Task Number 88**

**Analyze data to make food product marketing decisions.**

**Definition**

Analysis should include

- identifying data classifications
- researching data analytics tools
- using data analysis
- distinguishing between qualitative and quantitative data.

**Process/Skill Questions**

**Thinking**

- What role does market research play in developing an overall marketing strategy?
- What are the benefits of qualitative and quantitative data?
- Why should research be an ongoing process?
- How can one determine the benefits a product will offer?

**Communication**

- Why would a company select one research method over another?
- What types of information do companies share to improve decision making?

**Leadership**

- What is the role of ethics in collecting market data?
- Why is consumer privacy important in research?
- How is objectivity achieved in data collection?

**Management**

- Why are both random sampling and diverse population sampling important in data collection?
- How do companies use market data to remain competitive?
National Standards for Family and Consumer Sciences Education

9.5.2 Analyze data in statistical analysis in making development and marketing decisions.

FCCLA National Programs and Competitive Events

Career Connection
- My Skills
- My Life
- My Career
- My Plan

Power of One
- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

Competitive Event--STAR Events
- Career Investigation
- Food Innovations
- Hospitality, Tourism and Recreation
- Professional Presentation
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.04.02. Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.

FPP.04.03. Identify and explain the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems.

Task Number 89

Describe the role of science and food-science management in the development of new food products.

Definition

Description should include
- relating the role of science to the development of the food industry
- explaining the contribution of food scientists to the advancement of global food production
- identifying science skills necessary for successful scientific research
- outlining the process of developing new products in the food industry
- examining current issues and trends in the food industry.

Process/Skill Questions

Thinking
- How is science responsible for a nutritious, safe, and abundant food supply?
- What disciplines of science are involved in food science and technology?
• What impact do food scientists have on the availability of food?
• How will current issues and trends in the food industry impact food production?

Communication

• What communication skills are necessary for successful scientific research?
• How can food scientists communicate technical scientific language to general audiences?

Leadership

• Where can information about current food issues and trends be obtained?
• What various food-science careers exist?
• What are the educational requirements of different food-science careers?

Management

• What are career options for food scientists in food business management?
• What are the consequences of not having food scientists in food business management?

National Standards for Family and Consumer Sciences Education

9.5.2 Analyze data in statistical analysis in making development and marketing decisions.

FCCLA National Programs and Competitive Events

Career Connection

• My Skills
• My Life
• My Career
• My Plan

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Competitive Event--STAR Events

• Career Investigation
• Food Innovations
• Hospitality, Tourism and Recreation
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.02. 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.

FPP.04.01. Examine the scope of the food industry by evaluating local and global policies, trends, and customs for food production.
Task Number 90

Explain basic chemistry concepts and how ingredients react in food-science applications.

Definition
Explanation should include

- describing and illustrating the basic structure of atoms
- identifying periodic table symbols commonly used in food science
- defining ionic and covalent bonding
- explaining the difference between pure substances and mixtures
- evaluating physical and chemical reactions in lab experiments
- solving chemical equations to illustrate simple chemical reactions
- defining chemical leavening agent.

Process/Skill Question
Thinking

- What role does chemistry play in baking?
- What are the physical and chemical changes when preparing a basic chowder recipe? A fruit-bread recipe?
- Why is it important to understand the difference between ionic and covalent bonding?

Communication

- How do food preparation techniques relate to the chemical structure of ingredients in foods?
- What communication skills are necessary for food scientists in predicting how food products will perform during processing and preservation?
- How do scientists describe chemical reactions in writing?

Leadership

- What leadership skills are necessary when food scientists are preparing formulations of food products?
- What should be done to facilitate the implementation of procedures to ensure a safe lab experiment?

Management

- How would the basic understanding of business principles help a food scientist’s career?
- What trends might result in new jobs in the food industry?

National Standards for Family and Consumer Sciences Education
9.7 Demonstrate principles of food biology and chemistry.

FCCLA National Programs and Competitive Events

Career Connection

- My Skills
- My Life
- My Career
- My Plan

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Competitive Event–STAR Events

• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.02. 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.

Task Number 91

Prepare food products for presentation and assessment.

Definition
Preparation should include

• devising standardized recipes for proposed food products
• creating a production plan to include tools, equipment, and materials necessary for preparation
• performing all steps of standardized recipes accurately and in the given order so that the resulting products match the intended product exactly
• demonstrating elements of design and fundamentals of presentation
• illustrating knowledge of current trends in presentation
• developing a product evaluation rubric
• assessing the final product for visual appeal, quality of taste, and nutritional content.

Process/Skill Questions

Thinking

• What are the parts of a standardized recipe?
• What are the elements of design and fundamentals in food preparation?
• Why should food be attractively presented?

Communication

• Why is it important to have all abbreviations standardized?
• How can the importance of following proper methods of food preparation for quality results be communicated?
• What is the difference between a functional and nonfunctional garnish?

Leadership

• What are the consequences of organized planning and preparing of food? Of unorganized planning and preparing of food?
• What leadership skills can help us organize food preparation by a team in a busy kitchen?
• What are some current trends in plate presentation?
• What skills are needed to present attractive food?
Management

- What are some benefits of having all kitchen staff use standardized recipes?
- Why is time management important in the preparation of food?
- What production factors can influence presentation?
- Why should presentations have consistent portion sizes?
- What are the main elements of food presentation?

National Standards for Family and Consumer Sciences Education

9.5.3 Prepare food for presentation and assessment.

FCCLA National Programs and Competitive Events

Career Connection

- My Skills
- My Life
- My Career
- My Plan

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Competitive Event--STAR Events

- Baking and Pastry
- Career Investigation
- Culinary Arts
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.03.02. Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

Task Number 92

Explain the purpose of sensory evaluation panels and how to conduct a sensory panel, using appropriate controls.

Definition

Explanation should include
• comparing reasons for evaluating food products subjectively and objectively
• listing physical, psychological, cultural, and environmental influence on food preferences
• explaining how taste and aroma contribute to giving foods their flavors
• conducting a taste test panel.

Process/Skill Questions

Thinking

• What factors affect a person’s ability to detect flavors?
• What is taste bias?
• What factors affect a person’s ability to taste?
• Why is sensory evaluation important in the food industry?

Communication

• How can the evaluation documentation and format impact the evaluation outcomes?
• What are the possible impacts of the design of the sensory testing area?

Leadership

• How might panelists best be contacted and recruited?
• What impact might panelist background and demographics have on evaluation outcomes?
• Why is evaluator training an important consideration and how might it influence results?

Management

• How should target market demographics inform panelist recruitment?
• What factors should be considered in the choice of taste panel facility?
• Why would time of day be an important consideration when designing a sensory evaluation?

National Standards for Family and Consumer Sciences Education

9.5.6 Conduct sensory evaluations of food products.

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• My Skills
• My Life
• My Career
• My Plan

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

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• Career Investigation
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• Professional Presentation
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• Check the website for Skill Events
The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.03. Apply principles of human behavior to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.

Task Number 93

Identify food product development related to health and wellness needs.

Definition
Identification should include

- describing how the process of preparing, cooking, and storing food affects its nutritional content
- examining how cooking time and moisture affect the nutritional value of food
- examining the meaning of functional foods
- outlining how food product development has changed consumer perception of health and wellness.

Process/Skill Questions

Thinking

- How do storage techniques affect the nutrients in food?
- How do cooking techniques affect the nutrients in food?
- What effects do temperature and time have on nutrient retention in foods?
- What cooking methods best preserve the nutritional value of foods?
- How and to what extent does the length of exposure to air and moisture affect retention of nutrients?
- What ingredients offer the greatest opportunities in health and wellness?

Communication

- How can health and wellness benefits of a product be communicated to the consumer?
- How should consumer views of functional food be considered in the product development process?

Leadership

- How can the product development process be designed to account for health and wellness benefits?
- What effect might food processing have on the nutritive value of the product being developed?

Management

- What technological trends are likely to impact views on nutrition in the future?
- How can health and wellness be integrated into the marketing of a product?
- Why is nutrition an important component of product development?

National Standards for Family and Consumer Sciences Education

9.3.3 Apply principles of food production to maximize nutrient retention in prepared foods.
9.5.1 Analyze various factors that affect food preferences in the marketing of food.
9.5.2 Analyze data in statistical analysis in making development and marketing decisions.
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Career Connection
- My Skills
- My Life
- My Career
- My Plan

Power of One
- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

Student Body
- The Healthy You
- The Fit You
- The Real You
- The Resilient You

Competitive Event–STAR Events
- Career Investigation
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.01. 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.

Task Number 94

Identify sustainable practices related to food-product development.

Definition
Identification should include

- outlining the impact of sustainable lifestyles, sustainable diets, food loss and food waste management, and recycling on food-product development
- illustrating how sustainability, climate change, biodiversity, water, food and nutrition security, right-to-food, and diets are all connected.

Process/Skill Questions

Thinking
- Why should we be concerned about the environmental impact of food product development?
- What criteria do consumers use when selecting packaged foods?
Communication

- Why do manufacturers package the same product in a variety of ways?
- What communication skills can encourage sustainable production and practices?

Leadership

- Should manufacturers be held accountable for waste incurred from packaging? Why, or why not?
- What are the benefits of sustainability?

Management

- What steps can manufacturers take to reduce waste?
- How can processes be designed to be more sustainable?
- Why should the sustainability of sourcing be considered?

National Standards for Family and Consumer Sciences Education

9.5 Demonstrate use of current technology in food product development and marketing.

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Career Connection

- My Skills
- My Life
- My Career
- My Plan

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

Competitive Event—STAR Events

- Career Investigation
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Sustainability Challenge
- Teach and Train
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.03. Apply principles of human behavior to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.

FPP.03.03. Create food distribution plans and procedures to ensure safe delivery of food products.
Investigating Food Technology

Task Number 95

Describe examples of emerging trends that may impact careers in food science.

**Definition**

Description should include:

- developing need-based products
- applying new ideas to improve current processing methods
- analyzing individual studies to yield overall conclusions
- applying principles of food science to preservation of color, taste, texture, and other characteristics
- analyzing trends like molecular gastronomy
- explaining the role of science in the development of new food products
- analyzing preservation and packaging
- keeping current with trends, professional development, and career preparation and pathways
- reviewing regulations and standards.

**Process/Skill Questions**

**Thinking**

- How do consumer buying and eating trends lead to new technologies?
- What careers are available in the food science industry?
- Why is it important for technologies to stay current?
- How is impact to the industry measured?

**Communication**

- What organizations are involved in the development of a new food product?
- How do various organizations work together in the development of a new food product?

**Leadership**

- How do agencies such as the FDA make their standards known and adhered to by the public?
- How do we know if we are staying ahead of the curve in food science?
- What skills do we need to preserve color, taste, texture, and other characteristics?

**Management**

- What basic scientific laws should be used to solve problems in the food industry?
- What are the consequences of using technology in food product development? For individuals? Families? Employees? Companies?
- What resources are needed to implement emerging technologies?

**National Standards for Family and Consumer Sciences Education**

9.1 Analyze career paths within food science, food technology, dietetics, and nutrition industries.

9.5.1 Analyze various factors that affect food preferences in the marketing of food.

9.5.2 Analyze data in statistical analysis in making development and marketing decisions.
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Career Connection

• My Skills
• My Life
• My Career
• My Plan

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Competitive Event--STAR Events

• Career Investigation
• Entrepreneurship
• Hospitality, Tourism and Recreation
• National Programs in Action
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.04.02. Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.

Task Number 96

Describe the functions, operations, and maintenance of test laboratory and related equipment and supplies.

Definition

Description should include

• differences between the use of equipment for food science and for food preparation
• use, care, and maintenance of equipment and supplies
• application of the International System of Units.

Process/Skill Questions

Thinking

• Why is careful measurement important in food science experiments?
• What are different ways you can measure mass?
• What are similarities and differences between food science equipment and the food preparation equipment?
• What are some differences between systems of units?
• What equipment do food scientists use?

Communication

• What are common experimental errors?
• How can we help others understand the proper use and care of equipment and supplies?
• How can we stay up to date with the most current equipment and safety information?

Leadership

• How do you calculate the human factor in food experiments?
• What plans and criteria would we use to determine the proper upkeep of equipment and supplies?
• What should be done to facilitate the implementation of lab policies and procedures?
• How can we ensure that the group complies with the policies and procedures?

Management

• Why is it important to have a variable and a control when designing an experiment?
• What resources are needed to manage, operate, and maintain a test lab?
• What are the consequences of improper maintenance of labs, equipment, and supplies?

National Standards for Family and Consumer Sciences Education

9.5.4 Maintain test kitchen/laboratory and related equipment and supplies.
9.5.7 Conduct testing for safety of food products, utilizing available technology.

FCCLA National Programs and Competitive Events

Career Connection

• My Skills
• My Life
• My Career
• My Plan

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Competitive Event--STAR Events

• Career Investigation
• Food Innovations
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.01.01. Analyze and manage operational and safety procedures in food products and processing facilities.
FPP.01.02. Apply food safety and sanitation procedures in the handling and processing of food products to ensure food quality.
Task Number 97

Conduct testing for safety of food products, using up-to-date technology.

Definition

Testing should include

- identification of new technologies
- application of food safety and sanitation procedures
- use of the scientific method
- evaluation of results for scientific research
- consideration of preservation and packaging.

Process/Skill Questions

Thinking

- What prior knowledge is required to ensure safe and sanitary conditions in the lab?
- What are the lab rules and procedures necessary for a safe and sanitary environment?
- Why is it important to stay up to date with testing, data, and the technology used for testing?
- What criteria is used to test products, packaging, and preservation levels?
- What food preservation methods are most common?

Communication

- Why is accurate record keeping important in guaranteeing accurate reporting?
- How do food pathogens enter the food chain?
- What happens when expected results are received? Unexpected results?
- What is the best way to communicate important information to the general public?

Leadership

- What is the ethical responsibility to report foodborne illness?
- What skills do we need to conduct an experiment, using the scientific method?
- How do we know if we are staying current on the topic of food product testing?

Management

- What new technologies are currently emerging in food production?
- What controls need to be in place to ensure safety for everyone in the lab?
- How do we analyze the results of a test?
- What resources are needed to stay up to date on technology and testing procedures?

National Standards for Family and Consumer Sciences Education

9.5.7 Conduct testing for safety of food products, utilizing available technology.

FCCLA National Programs and Competitive Events

Career Connection

- My Skills
- My Life
- My Career
- My Plan

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

Competitive Event--STAR Events
• Career Investigation
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.01.01. Analyze and manage operational and safety procedures in food products and processing facilities.

Task Number 98

Describe the benefits of various technological advances on the scientific study, processing, and preparation of food products.

Definition
Description should include

• benefits and drawbacks of new technologies
• how commercial production affects the safety and quality of food products
• how new procedures affect the nutritional value of food products
• trends in food, packaging, preparation methods, and related areas.

Process/Skill Questions

Thinking

• What tests should be required for new food products to ensure food safety?
• What are future trends in food production and how will they affect the consumer?
• What are some new technologies that exist in the world of studying, processing, and preparing food?
• What issues affect the safety and quality of commercial food production?

Communication

• How can we utilize the Internet to research current products?
• Why is research central to the development of every new food product?
• How do we get information to the public about new products and procedures for food processing? How do we address safety concerns?
• What questions do we need to ask about the safety and quality of food production?

Leadership

• How can we ensure food safety and still provide healthy, nutritious food?
• What skills do we need to successfully apply technology in food science, processing, and preparation?
• How do we measure the impact of technological advances on the industry?
Management

- What is the timeline in the development of new food products?
- What other resources are available for food development research?
- What actions can individuals and society take to evaluate technological advances in commercial food production to promote wellness?
- What should be our standards in managing nutritional value retention when testing new procedures?

National Standards for Family and Consumer Sciences Education

9.3.3 Apply principles of food production to maximize nutrient retention in prepared foods.

9.5 Demonstrate use of current technology in food product development and marketing.

FCCLA National Programs and Competitive Events

Career Connection

- My Skills
- My Life
- My Career
- My Plan

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

STAND Up

- Assess
- Educate
- Advocate

Competitive Event--STAR Events

- Career Investigation
- Culinary Arts
- Food Innovations
- National Programs in Action
- Nutrition and Wellness
- Professional Presentation
- Sports Nutrition
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.03.02. Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.
Task Number 99

Review standards of identity for foods and Reference Amounts Customarily Consumed (RACC).

Definition
Review should include

- effects of additives, preservatives, and dyes on food
- labeling, truth-in-labeling, graphic representation, and marketing materials
- expectations vs. new and emerging products
- trade-offs (i.e., what may be gained or lost when fat or sugar is traded out).

Process/Skill Questions

Thinking

- Who is responsible for mandating truth-in-advertising for new products?
- What are the basic concepts of standards of identity for food, and RACC?
- What should be accomplished with labeling laws?

Communication

- What steps can we take to educate the public on basic nutrition? Truth-in-labeling?
- What communication skills do we need to use to communicate information to the public?
- What questions do we ask in order to clarify the meaning of recommended?

Leadership

- How should information be shared to eliminate misinformation?
- What skills do we need to relate to others with the public to ensure appropriate decisions regarding trade-offs?
- What is the impact of contradictions and inaccuracies on food labels?

Management

- How can information be shared on a level to promote understanding by the general public?
- What resources impact labeling?
- What should be our standards in managing standardizing the system?
- What actions can individuals, families, and society take to promote optimal health and disease prevention?

National Standards for Family and Consumer Sciences Education

9.3.5 Analyze recipe/formula proportions and modifications for food production.

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Career Connection

- My Skills
- My Life
- My Career
- My Plan

Power of One

- A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

STAND Up
• Assess
• Educate
• Advocate

Competitive Event--STAR Events
• Career Investigation
• Culinary Arts
• Food Innovations
• National Programs in Action
• Nutrition and Wellness
• Professional Presentation
• Public Policy Advocate
• Sports Nutrition
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• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.02.02. 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.

FPP.02.03. Apply principles of human behavior to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.

Task Number 100

Identify ethical considerations for the use of food technologies.

Definition
Identification should include

- employee ethics
- truth-in-advertising
- consumer awareness
- food safety and security
- nutritional awareness
- knowledge of federal regulations and allowances
- long-term health needs of the consumer.

Process/Skill Questions

Thinking

- How do researchers conduct field tests for the results of their experiments?
- How can we guarantee food security in the United States?
- What careers are involved in food ethics? Food technologies?
- What values support ethical considerations in the area of food technology?

Communication
What questions could be asked to a test group about a new food product?
How can we work together as a world market to secure food safety?
How can we effectively communicate ethical considerations and promote consumer awareness?
How can we ensure that individuals involved in food technologies are not biased?

Leadership

What are the consequences of unethical decisions in the long term?
What actions should we take to guarantee truth-in-advertising procedures are followed according to required guidelines?

Management

What government agencies are responsible for establishing the qualifying date for a new food product?
What steps do we need to take to ensure proper food-testing procedures are followed?
What might be the consequences of unethical uses of food technology for consumers?

National Standards for Family and Consumer Sciences Education

9.5 Demonstrate use of current technology in food product development and marketing.

FCCLA National Programs and Competitive Events

Career Connection

• My Skills
• My Life
• My Career
• My Plan

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

STAND Up

• Assess
• Educate
• Advocate

Competitive Event–STAR Events

• Career Investigation
• Entrepreneurship
• Food Innovations
• Hospitality, Tourism and Recreation
• Interpersonal Communications
• National Programs in Action
• Nutrition and Wellness
• Professional Presentation
• Public Policy Advocate
• Say Yes to FCS Education
• Sports Nutrition
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The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.04.02. Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.

Investigating Food Sources and Systems

Task Number 101

Compare various methods of food production.

Definition

Comparison should include

- traditional agricultural practices vs. alternative production methods (e.g., hydroponics, aquaponics, container gardens)
- methods of traditional production and sustainable agricultural practices
- advancements in technology related to agricultural production (e.g., bioengineering, GPS technology for fertilizer and pesticide application)
- large-scale production methods vs. small-scale production methods.

Process/Skill Questions

Thinking

- How has conventional farming changed over time?
- What does the term *local* mean when sourcing food items?
- Why has locally sourced food gained in popularity?
- What are the benefits and potential risks of genetically modified organism (GMO) crops?

Communication

- What do consumers need to know about GMO-based foods?
- How are GMO crops marketed to the public?

Leadership

- What foods have been produced using biotechnology as envisioned by the U.S. Department of Agriculture?
- How did the "Green Revolution" shape agricultural production worldwide?

Management

- How do local restaurants and stores market the term *local* as it refers to products being sold?
- What is the difference between natural and artificial selection?

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Career Connection

- My Skills
- My Life
- My Career
- My Plan

Power of One
• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

STAND Up

• Assess
• Educate
• Advocate

Competitive Event--STAR Events

• National Programs in Action
• Professional Presentation
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.03.02. Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.

FPP.03.03. Create food distribution plans and procedures to ensure safe delivery of food products.

FPP.04.01. Examine the scope of the food industry by evaluating local and global policies, trends, and customs for food production.

FPP.04.02. Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.

Task Number 102

Describe agricultural practices.

Definition

Description should include

• efficiency in cost and its effect on affordable food
• small-scale vs. large-scale farming operations
• historical progression of traditional plowing to no-till techniques
• pest-management practices in agriculture.

Process/Skill Questions

Thinking

• How would you explain the increased cost of organic foods and their overall affordability?
• How do family-owned and corporate farms differ in product output?
• How has the use of pesticides in agriculture changed over time?
• What are the advantages and disadvantages of pesticide use GMO crops?
• What are the basic concepts of corporate-owned farming and crops (e.g., corn, soybeans) produced using these methods?

Communication
What concerns have been voiced by some consumers relating to allergies, gene contamination, and religious or cultural objections?
What labeling laws exist for bioengineered foods?

Leadership

What guidelines should be in place for GMO products?
What advances in technology have improved agricultural practices?

Management

What are the consequences of using GMO products?
What labeling laws should apply to GMO crops?
How should companies market the use of GMO products?

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Power of One

A Better You
Family Ties
Working on Working
Take the Lead
Speak out for FCCLA

STAND Up

Assess
Educate
Advocate

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National Programs in Action
Professional Presentation
Check the national website for online events
Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.03.03. Create food distribution plans and procedures to ensure safe delivery of food products.
FPP.04.02. Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.

Task Number 103

Identify the implications of local and globalized food sources.

Definition

Identification should include

- year-round variety of foods and effect on pricing
- nutrient composition in imported and exported foods
- food safety and quality in imported products
- impact of global production on communities where the food is produced.
Process/Skill Questions

Thinking

- What are some produce items available year-round in the grocery store?
- How has the selection found in stores changed over time?
- How does shelf life and transportation time affect the nutrient density of food?
- What is the price advantage of buying local and in-season produce?
- What is the harvesting and transportation process of imported products?

Communication

- What information and resources can help people optimize the land they use to grow crops in areas where food is scarce?
- What do we do about understanding and evaluating food production?
- How can hydroponics and aquaponics address issues of seasonality and efficiency?

Leadership

- What efforts are being made to ensure safety as foods are transported around the world?
- What should be done to facilitate the implementation of procedures to ensure food safety?

Management

- What role does science play in processing and preserving foods so that busy families can prepare wholesome meals quickly?
- What are the consequences of using local food sources? Globalized food sources?

FCCLA National Programs and Competitive Events

Power of One

- A Better You
- Family Ties
- Working on Working
- Take the Lead
- Speak out for FCCLA

Competitive Event--STAR Events

- Professional Presentation
- Check the national website for online events
- Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.04.02. Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.

Task Number 104

Identify differences between international and U.S. food regulations.

Definition

Identification should include
• World Health Organization (WHO)
• Codex and Food and Agriculture Organization (FAO)
• U.S. Food and Drug Administration
• foods and additives used in U.S. agriculture but banned in other countries.

Process/Skill Questions

Thinking

• What is the role of WHO as it relates to the food industry?
• What is the role of Codex as it relates to agriculture?
• How does WHO affect our supply of food?
• Why are the Codex Alimentarius standards necessary?

Communication

• What role does the U.S. have in WHO?
• What are the consequences of not communicating differences between international and U.S. food regulations?

Leadership

• What lessons have WHO, Codex, FAO, and other international agencies learned about hunger?
• What strategies would bring about changes in international and U.S. food regulations?

Management

• How does data obtained from WHO affect our nation’s food supply?
• What actions can individuals take to evaluate the differences between international and U.S. food regulations?

FCCLA National Programs and Competitive Events

Career Connection

• My Skills
• My Life
• My Career
• My Plan

Power of One

• A Better You
• Family Ties
• Working on Working
• Take the Lead
• Speak out for FCCLA

STAND Up

• Assess
• Educate
• Advocate

Competitive Event--STAR Events

• Food Innovations
• National Programs in Action
• Nutrition and Wellness
• Professional Presentation
• Public Policy Advocate
• Check the national website for online events
• Check the website for Skill Events

The National Council for Agricultural Education: Agriculture, Food and Natural Resources Content Standards

FPP.04.03. Identify and explain the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems.

SOL Correlation by Task

<table>
<thead>
<tr>
<th>Exploring Food Science and Dietetics</th>
<th>English: 11.5, 12.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>39 Describe food systems and U.S. consumption trends.</td>
<td>History and Social Science: VUS 14; Govt 9, 14</td>
</tr>
<tr>
<td>40 Explore the various careers in the food industry.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>41 Analyze careers within the food science, food technology, dietetics, and nutrition industries.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>42 Differentiate the pathways in the food science and dietetics industries.</td>
<td>English: 11.5, 12.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Examining The Nutritional Composition of Foods</th>
<th>English: 11.3, 11.5, 12.3, 12.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>43 Define the function of carbohydrates.</td>
<td>Science: BIO.2</td>
</tr>
<tr>
<td>44 Define the function of lipids.</td>
<td>English: 11.3, 11.5, 12.3, 12.5</td>
</tr>
<tr>
<td>45 Identify the functions of proteins.</td>
<td>Science: BIO.2</td>
</tr>
<tr>
<td>46 Define the functions of vitamins, minerals, and phytochemicals in the diet.</td>
<td>English: 11.3, 11.5, 11.6, 12.3, 12.5, 12.6</td>
</tr>
<tr>
<td>47 Analyze the effects of different processing methods on nutritional quality.</td>
<td>Science: BIO.4</td>
</tr>
<tr>
<td>48 Identify the function of water activity and pH in food preparation and preservation.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>49 Describe test methods for water activity and pH used in the food industry.</td>
<td>Science: CH.4</td>
</tr>
</tbody>
</table>
|   | Identify food allergens and their origins as defined in the Food and Drug Administration (FDA) *Food Code*. | English: 11.3, 11.6, ‘12.3, 12.6  
History and Social Science: Govt 7, 8, 9, 14 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>Describe how the presence of food allergens impacts the food industry’s testing processes and procedures for handling allergen contamination.</td>
<td>English: 11.5, 12.5</td>
</tr>
</tbody>
</table>
| 52 | Explore various methods used to test for carbohydrates, protein, lipids, and vitamins and minerals. | English: 11.5, 12.5  
Science: BIO.2 |

**Implementing Risk Management**

|   | Define Hazard Analysis Critical Control Point (HACCP). | English: 11.3, 12.3  
History and Social Science: Govt 7, 8, 9, 14 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>54</td>
<td>Trace the flow of food in food-service operations.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>55</td>
<td>Analyze risk factors and points of vulnerability in the food supply continuum, from source to production to distributor.</td>
<td>English: 11.3, 11.5, 12.3, 12.5</td>
</tr>
</tbody>
</table>
| 56 | Identify the regulatory agencies and their primary roles, from food production through consumption. | English: 11.5, 11.6, 12.5, 12.6  
History and Social Science: Govt 7, 8, 9, 14 |
| 57 | Analyze risk factors that contribute to foodborne illnesses. | English: 11.5, 11.6, 12.5, 12.6 |
| 58 | Describe methods for managing food allergens in a food system. | English: 11.5, 12.5 |
| 59 | Identify the process of responding to foodborne illnesses and outbreaks. | English: 11.5, 12.5  
History and Social Science: Govt 7, 8, 9, 14 |
| 60 | Demonstrate Hazard Analysis Critical Control Point (HACCP) implementation. | English: 11.5, 12.5  
History and Social Science: Govt 7, 8, 9, 14 |
| 61 | Demonstrate practices and procedures that assure personal and workplace health and hygiene. | English: 11.5, 12.5  
History and Social Science: Govt 7, 8, 9, 14  
Science: BIO.4 |
| 62 | Perform a safety evaluation based on OSHA regulations. | English: 11.5, 11.6, 12.5, 12.6  
History and Social Science: Govt 7, 8, 9, 14 |

**Exploring Diet and Nutrition Fundamentals**
<table>
<thead>
<tr>
<th></th>
<th>Activity</th>
<th>Subject Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>Apply basic concepts of human nutrition.</td>
<td>English: 11.5, 12.5 Science: BIO.3, 4</td>
</tr>
<tr>
<td>64</td>
<td>Explain nutritional guidelines.</td>
<td>English: 11.5, 12.5 History and Social Science: Govt 7, 8, 9, 14</td>
</tr>
<tr>
<td>65</td>
<td>Describe factors affecting a person’s food preferences.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>66</td>
<td>Describe food security with regard to food access (e.g., local, state, national, international).</td>
<td>English: 11.3, 11.5, 12.3, 12.5 History and Social Science: Govt 7, 8, 9, 14</td>
</tr>
<tr>
<td>67</td>
<td>Compare nutrient requirements across the life span.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>68</td>
<td>Apply basic concepts of nutrition for meeting special dietary needs.</td>
<td>English: 11.5, 12.5</td>
</tr>
</tbody>
</table>

**Applying Nutritional and Dietary Requirements**

<table>
<thead>
<tr>
<th></th>
<th>Activity</th>
<th>Subject Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>Identify food guidelines for various populations with special dietary needs.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>70</td>
<td>Identify nutritional guidelines for persons with chronic health conditions.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>71</td>
<td>Interpret food-, nutrition-, and menu-labeling guidelines.</td>
<td>English: 11.5, 12.5 History and Social Science: Govt 7, 8, 9, 14</td>
</tr>
<tr>
<td>72</td>
<td>Assess the nutritional composition of meals.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>73</td>
<td>Modify a recipe based on nutritional needs.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>74</td>
<td>Develop a daily menu based on a modified diet.</td>
<td>English: 11.5, 12.5</td>
</tr>
</tbody>
</table>

**Examining Food Processing, Preservation, and Packaging**

<table>
<thead>
<tr>
<th></th>
<th>Activity</th>
<th>Subject Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>Outline the history of food preservation and processing.</td>
<td>English: 11.6, 11.7, 12.6, 12.7</td>
</tr>
<tr>
<td>76</td>
<td>Examine the role of additives in processed foods.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>77</td>
<td>Describe procedures that affect product quality performance.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>78</td>
<td>Describe units of operation in food processing and preservation.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>79</td>
<td>Examine the principles of fermentation.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>80</td>
<td>Implement food preparation, production, and testing systems.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td></td>
<td>Examining Product Development</td>
<td></td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>81</td>
<td>Analyze packaging materials with regard to types, functions, and environmental factors.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>82</td>
<td>Explore how different packaging affects food/nutrient quality.</td>
<td>English: 11.5, 12.5</td>
</tr>
</tbody>
</table>

**Examining Product Development**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
</table>
| 83 | Review the history of food processing and product development. | English: 11.5, 11.8, 12.5, 12.8  
History and Social Science: VUS 8, 14; Govt 7, 8, 9, 14 |
| 84 | Identify the need for food product development. | English: 11.5, 12.5 |
| 85 | Review the process for food product development. | English: 11.5, 12.5 |
| 86 | Analyze various marketing strategies that affect consumer food choices. | English: 11.5, 12.5 |
| 87 | Explore consumer trends and how they impact the food industry and careers within it. | English: 11.5, 12.5 |
| 88 | Analyze data to make food product marketing decisions. | English: 11.5, 11.8, 12.5, 12.8  
Mathematics: AII.9, AFDA.8, PS.1*, PS.2*, PS.3*, PS.4*, PS.7*, PS.8*, PS.9*, PS.10*, PS.12*, PS.15 |
| 89 | Describe the role of science and food-science management in the development of new food products. | English: 11.5, 11.6, 12.5, 12.6  
Science: BIO.1 |
| 90 | Explain basic chemistry concepts and how ingredients react in food-science applications. | English: 11.5, 12.5  
Science: CH.2, 3 |
| 91 | Prepare food products for presentation and assessment. | English: 11.5, 12.5 |
| 92 | Explain the purpose of sensory evaluation panels and how to conduct a sensory panel, using appropriate controls. | English: 11.5, 12.5 |
| 93 | Identify food product development related to health and wellness needs. | English: 11.5, 12.5 |
| 94 | Identify sustainable practices related to food-product development. | English: 11.6, 11.7, 12.6, 12.7 |

**Investigating Food Technology**

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<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>95</td>
<td>Describe examples of emerging trends that may impact careers in food science.</td>
</tr>
<tr>
<td></td>
<td>Description</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 96| Describe the functions, operations, and maintenance of test laboratory and related equipment and supplies. | English: 11.5, 12.5  
|   |                                                                             | Science: CH.1                          |
| 97| Conduct testing for safety of food products, using up-to-date technology.    | English: 11.5, 12.5  
|   |                                                                             | Science: BIO.1; CH.1; ES.1             |
| 98| Describe the benefits of various technological advances on the scientific study, processing, and preparation of food products. | English: 11.5, 12.5 |
| 99| Review standards of identity for foods and Reference Amounts Customarily Consumed (RACC). | English: 11.5, 11.6, 12.5, 12.6 |
|100| Identify ethical considerations for the use of food technologies.           | English: 11.5, 12.5 |

**Investigating Food Sources and Systems**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Subject Areas</th>
</tr>
</thead>
</table>
| 101| Compare various methods of food production.                                 | English: 11.5, 12.5  
|   |                                                                             | History and Social Science: VUS 14; Govt 7, 8, 9, 14 |
| 102| Describe agricultural practices.                                             | English: 11.5, 12.5  
|   |                                                                             | History and Social Science: VUS 14; Govt 7, 8, 9, 14 |
| 103| Identify the implications of local and globalized food sources.             | English: 11.5, 12.5  
|   |                                                                             | History and Social Science: VUS 14; Govt 7, 8, 9, 14 |
| 104| Identify differences between international and U.S. food regulations.       | English: 11.5, 12.5  
|   |                                                                             | History and Social Science: VUS 14; Govt 7, 8, 9, 14 |
Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials (Only apply to 36-week courses)

- College and Work Readiness Assessment (CWRA+)
- Food Safety & Science Certification Examination
- Food Science Fundamentals Assessment
- Leadership Essentials Assessment
- Meat Evaluation Certification Examination
- National Career Readiness Certificate Assessment
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.

- Applied Agricultural Concepts (8073/36 weeks)
- Biological Applications in Agriculture (8086/36 weeks)
- Biotechnology Applications in Agriculture (8087/36 weeks)
- Biotechnology Foundations in Agricultural and Environmental Science (8085/36 weeks)
- Biotechnology Foundations in Health and Medical Sciences (8344/36 weeks)
- Culinary Arts I (8275/36 weeks, 280 hours)
- Culinary Arts II (8276/36 weeks, 280 hours)
- Culinary Arts Specialization (8279/36 weeks)
- Foundations of Agriculture, Food, and Natural Resources (8006/36 weeks)
- Introduction to Culinary Arts (8249/18 weeks)
- Introduction to Culinary Arts (8250/36 weeks)
- Introduction to Nutrition for Health and Medical Sciences (8390/18 weeks)
- Introduction to Health and Medical Sciences (8301/18 weeks)
- Introduction to Health and Medical Sciences (8302/36 weeks)
- Nutrition and Wellness (8228/18 weeks)
- Nutrition and Wellness (8229/36 weeks)

Career Cluster: Agriculture, Food and Natural Resources

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Systems</td>
<td>Animal Breeder, Husbandry, Animal Geneticist, Animal Nutritionist, Animal Scientist, Aquacultural Manager, Poultry Manager, Veterinarian, Veterinary Technician</td>
</tr>
<tr>
<td>Environmental Service Systems</td>
<td>Environmental Compliance Inspector, Environmental Sampling and Analysis Technician, Toxicologist</td>
</tr>
<tr>
<td>Food Products and Processing Systems</td>
<td>Biochemist, Food Scientist</td>
</tr>
<tr>
<td>Natural Resources Systems</td>
<td>Microbiologist, Wildlife Manager</td>
</tr>
<tr>
<td>Plant Systems</td>
<td>Botanist, Forest Geneticist, Plant Breeder/ Geneticist, Soil and Plant Scientist</td>
</tr>
<tr>
<td>Power, Structural, and Technical Systems</td>
<td>Agricultural Engineer</td>
</tr>
</tbody>
</table>
### Career Cluster: Health Science

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biotechnology Research and Development</strong></td>
<td>Biochemist</td>
</tr>
<tr>
<td><strong>Diagnostics Services</strong></td>
<td>Cardiovascular Technologist</td>
</tr>
<tr>
<td></td>
<td>Computer Tomography (CT) Technologist</td>
</tr>
<tr>
<td></td>
<td>Medical, Clinical Laboratory Technician</td>
</tr>
<tr>
<td></td>
<td>Nuclear Medicine Technologist</td>
</tr>
<tr>
<td></td>
<td>Radiologic Technologist, Radiographer</td>
</tr>
<tr>
<td><strong>Health Informatics</strong></td>
<td>Epidemiologist</td>
</tr>
<tr>
<td></td>
<td>Health Educator</td>
</tr>
<tr>
<td></td>
<td>Medical Assistant</td>
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<tr>
<td></td>
<td>Medical, Health Services Manager</td>
</tr>
<tr>
<td><strong>Support Services</strong></td>
<td>Environmental Sampling and Analysis Technician</td>
</tr>
<tr>
<td></td>
<td>Food Service Worker</td>
</tr>
<tr>
<td></td>
<td>Medical, Clinical Laboratory Technologist</td>
</tr>
<tr>
<td><strong>Therapeutic Services</strong></td>
<td>Athletic Trainer</td>
</tr>
<tr>
<td></td>
<td>Certified Nurse Aide</td>
</tr>
<tr>
<td></td>
<td>Dental Assistant</td>
</tr>
<tr>
<td></td>
<td>Dentist</td>
</tr>
<tr>
<td></td>
<td>Exercise Physiologist</td>
</tr>
<tr>
<td></td>
<td>Home Health Aide</td>
</tr>
<tr>
<td></td>
<td>Licensed Practical Nurse</td>
</tr>
<tr>
<td></td>
<td>Medical Assistant</td>
</tr>
<tr>
<td></td>
<td>Occupational Therapist</td>
</tr>
<tr>
<td></td>
<td>Occupational Therapist Aide</td>
</tr>
<tr>
<td></td>
<td>Pharmacy Technician</td>
</tr>
<tr>
<td></td>
<td>Physical Therapist</td>
</tr>
<tr>
<td></td>
<td>Physical Therapist Assistant</td>
</tr>
<tr>
<td></td>
<td>Physician</td>
</tr>
<tr>
<td></td>
<td>Recreation Therapist</td>
</tr>
<tr>
<td></td>
<td>Registered Nurse</td>
</tr>
<tr>
<td></td>
<td>Respiratory Therapist</td>
</tr>
<tr>
<td></td>
<td>Respiratory Therapy Technician</td>
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<tr>
<td></td>
<td>Surgeon</td>
</tr>
<tr>
<td></td>
<td>Surgical Technologist</td>
</tr>
<tr>
<td></td>
<td>Veterinary Assistant</td>
</tr>
<tr>
<td></td>
<td>Veterinary Technologist</td>
</tr>
</tbody>
</table>

### Career Cluster: Human Services

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Counseling and Mental Health Services</strong></td>
<td>Dietitian, Nutritionist</td>
</tr>
<tr>
<td></td>
<td>Educational/School Counselor</td>
</tr>
<tr>
<td></td>
<td>Nutritional Counselor</td>
</tr>
<tr>
<td></td>
<td>Rehabilitation Counselor</td>
</tr>
<tr>
<td></td>
<td>Substance Abuse and Behavioral Disorder Counselor</td>
</tr>
<tr>
<td><strong>Early Childhood Development and Services</strong></td>
<td>Child Care Worker</td>
</tr>
<tr>
<td></td>
<td>Director of Early Childhood Education Center</td>
</tr>
<tr>
<td></td>
<td>Elementary School Teacher</td>
</tr>
<tr>
<td></td>
<td>Nanny</td>
</tr>
<tr>
<td></td>
<td>Parent and Family Educator</td>
</tr>
<tr>
<td></td>
<td>Preschool Teacher</td>
</tr>
<tr>
<td></td>
<td>Teacher Assistant</td>
</tr>
<tr>
<td><strong>Family and Community Services</strong></td>
<td>Adult Day Care Coordinator</td>
</tr>
<tr>
<td></td>
<td>Educational/School Counselor</td>
</tr>
<tr>
<td></td>
<td>Medical, Public Health Social Worker</td>
</tr>
<tr>
<td></td>
<td>Personal and Home Care Aide</td>
</tr>
<tr>
<td><strong>Personal Care Services</strong></td>
<td>Personal and Home Care Aide</td>
</tr>
<tr>
<td></td>
<td>Personal Trainer</td>
</tr>
</tbody>
</table>