

FOOD SCIENCE AND TECHNOLOGY

Purpose

The Food Science and Technology Career Development Event is designed to promote learning activities in food science and technology related to the food industry and to assist students in developing practical knowledge of principles used in a team decision-making process.

Objectives

The Food Science and Technology Career Development Event provides the opportunity for the participant to:

- I. Gain an awareness of career and professional opportunities in the field of food science and technology.
- II. Experience group participation and leadership responsibilities in a competitive food science and technology program.
- III. Develop technical competence and personal initiative in a food science and technology occupation.

Event Rules

NOTE: In 2018, the Food Science and Technology CDE is being piloted in Missouri. As a pilot, each district may send a number of teams equal to the number of areas in their district to the State CDE Event. Additionally, the state winning team will advance to the national level.

Team make-up: The team will consist of four members with the TOP 3 members' scores being totaled for the team score. Top 3 individual scores will be used to determine which teams advance to Team Activity. All team members will participate in the Team Activity. Final team scores will be based on Top 3 Individual scores and Team Activity scores.

1. Official FFA dress is required for all participants. A 10% penalty will be assessed per individual not in FFA official dress as identified in the current edition of the FFA Manual. All contestants in the FFA Leadership Development Events must wear Official FFA Dress, as identified in the current FFA Manual. Members may also wear black boots instead of shoes. Members will be checked for Official Dress by physical sight by the judge while the member is standing vertically at the time of check in.
2. Participants will use Scantron Food Science (713-3) from:
<https://www.judgingcard.com/ScanSheets/samples/713-3-FoodSci.pdf>
3. Teams and/or individuals will not be permitted to use electronic media during the event, unless provided by the CDE Superintendent.
 - **This includes but is not limited to cell phones, mp3 players, cameras, etc.**
 - **Any participant in possession of an unauthorized electronic device, except a calculator, in the event area is subject to disqualification.**
4. Allergy Information: Food products used in this event may contain or come in contact with potential allergens. Advisors must submit a special needs request for participants with any allergies. The event committee will make all reasonable efforts to accommodate students with food allergies.
5. Each participant must provide:
 - A clipboard that is clean and free of notes.
 - Two sharpened No. 2 pencils.
6. Calculators may be used in all events. Nonprogrammable (simple scientific) or six function calculators may be used. Please refer to the approved list of calculators in the General CDE Guidelines.

Event Format

The Food Science and Technology CDE is comprised of the following components:

A. Individual Activities:

1. Written Exam
2. Problem Solving/Math Practicum
3. Food Safety Practicums
 - a. Safety/Sanitation Practicum
 - b. Customer Inquiry Practicum

4. Sensory Evaluation Practicums
 - a. Triangle Tests
 - b. Aroma Identification

B. Team Activity

C. Setting Up the event: It is recommended that the teams be divided into two groups for the individual activities. One group will complete the Written Exam, Math Problem Solving, and Customer Inquiry (60 Minutes). The other group will complete the Safety/Sanitation Practicum (2 minutes/sample), Aroma Identification (60 seconds per sample), Triangle Test (60 seconds per sample). After the 60 minutes, the groups should switch. Teammates should not interact with each other during the Individual Activities portions and should be arranged so they are not at the same stations at the same time.

State Event Schedule

Group A	Group B
Written Exam	Safety/Sanitation Practicum
Math Problem Solving	Aroma Identification
Customer Inquiry	Triangle Test

Break for Tabulation – 11am – Students may leave the contest area for lunch while individual scores are tabulated.

1pm – Reconvene at contest location for announcements of teams advancing to team activity portion. Once students check into the contest area, they must remain until it is their time to present for the team activity.

Each of the components are described below:

A. INDIVIDUAL ACTIVITIES:

1. Written Exam: (150 points possible per individual)

The objective questions administered during the food science and technology examination will be designed to determine each team member's understanding of the basic principles of food science and technology. The test will be 60% listed from past National FFA Exams since and including 2000. The remaining 40% will come from the *Principle of Food Science*, 4th edition.

Team members will work individually to answer each of the 50 questions. Each person will have 60 minutes to complete the examination. Each question will be worth three points, for a total of 150 points.

2. PROBLEM SOLVING/ MATH PRACTICUM: (25 Points Possible per individual)

Participants will answer a series of five mathematical calculations based on common food science themes. Questions may include nutrition calculations, ingredient quantity, cost benefit analysis, estimation of cost/margin of goods sold, conversions, processing conditions, etc.

Example Question. The perfect glass of sweet tea is 20 percent sugar. Jim is making a one-gallon container of sweet tea. How many cups of sugar should he add?

- a. 2.4 cups
- b. 3.2 cups
- c. 3.4 cups
- d. 4 cups

3. FOOD SAFETY PRACTICUMS

a. Safety/Sanitation Practicum (25 points per individual)

Team members will work individually to evaluate five (5) photos. The contestant will evaluate the situations presented and select from a list of possible misuses of GMP's and HACCP.

b. Customer Inquiry Practicum (25 points per individual)

Each participant will be given five scenarios representing general consumer inquiries. Participants must determine if the consumer inquiry reflects a quality or safety issue (two points per scenario) and determine if it is a biological, chemical or physical concern or hazard (three

points per scenario). Each Customer Inquiry is worth five points each for a total of twenty-five points.

4. SENSORY EVALUATION PRACTICUMS

a. Triangle Tests: (20 points per individual)

Five different triangle tests will be conducted. Participants are expected to identify the different samples through flavor, aroma, visual cues and/or textural differences. Answers will be given on the sheet provided. No list will be provided for this segment of the practicum. Each triangle test is worth five points. (20 points)

b. Aromas (50 points per individual)

Each participant will be asked to identify ten different aromas from vials provided at each station and record the answer on the sheet provided. A list of potential aromas will be provided to each person. Each sample is worth 5 points. (50 points) Participants are NOT allowed to have a ‘nasal cleanse’ or smell anything in between the aroma samples.

10.	Apple		21.	Ginger		32.	Peach
11.	Banana		22.	Grape		33.	Peppermint
12.	Basil		23.	Lemon		34.	Raspberry
13.	Butter		24.	Licorice (anise)		35.	Sage
14.	Cherry		25.	Lime		36.	Smoke (liquid)
15.	Chocolate		26.	Maple		37.	Strawberry
16.	Cinnamon		27.	Molasses		38.	Vanilla
17.	Clove		28.	Nutmeg		39.	Watermelon
18.	Coconut		29.	Onion		40.	Wintergreen
19.	Coffee		30.	Orange			
20.	Garlic		31.	Oregano			

B.TEAM ACTIVITY

TEAM PRODUCT DEVELOPMENT PROJECT (400 POINTS POSSIBLE PER TEAM)

At the completion of the Individual Practicums, team scores will be calculated and the Top eight (8) teams will advance to participate in the Team Product Development Project. The teams will draw for order of presentations.

Each team will receive a product development scenario describing the need for a new or redesigned product that appeals to a potential market segment. The team’s task will be to design

a new food product or reformulate an existing product based on information contained within the product development scenario.

Each team will be provided with packaging materials, ingredients and necessary ingredient information in order to develop, label and package a product. The following supplies must be provided to each team:

- 2 Sheets of 22" x 28" posterboard
- Notecards
- White paper
- Markers
- Ruler
- Large Eraser
- Easels in the presentation room

The team will have 60 minutes to respond to the product development scenario and reformulate or develop a product, calculate a nutritional label, develop the ingredient statement and information panel and develop the front or principle display panel to reflect the new product.

The team will be responsible for understanding and using the following concepts to develop a presentation addressing the following:

Cost of goods sold

Nutrition

Target audience

Quality control

Marketing and sales

Product

Processing

Packaging

Food safety

Formulation concepts

Quality of presentation

After this time period, each team member will contribute to a ten (10) minute oral presentation delivered to a panel of judges. No electronic media will be used in the presentation.

Categories	Platforms	Markets (Domestic & International)
Cereal	Frozen	Retail
Snacks	Refrigerated	Wholesale
Meals	Shelf-stable	Food Service
Side Dishes	Convenience	Convenience Store
Beverages	Ready to eat	
Supplements	Heat and serve	
Condiments		
Desserts		

Following the presentation there will be a five (5) minute question and answer period with the judges in which each team member is expected to contribute. All materials will be collected after the presentation.

Total time involved for each team will be 75 minutes. Total number of points possible for this activity will be 400 points.

Product development scenarios will describe a category, platform and market. These may include but are not limited to the following categories, platforms and markets listed below. Deadline for letting teachers know is February 1. State CDE Superintendent will email all teachers the list of which category, platform and market will be used at the State CDE Event by February 1. Evaluation criteria and points for team product development activity can be found on the team product development scorecard.

2019 Product Info: Beverage, Shelf-stable, Retail Market

Example of scenario product from past events:

Category	Platform	Market	Actual Product
Side Dish	Ready to Prepare	Retail or big box	Whole grain, low sodium side dish
Beverage	Shelf-stable	Retail	Shelf-stable specialty coffee
Side dish	Refrigerated	Retail	Side salad for baby boomers
Snack	Shelf-stable	Retail	Non-nut snack bar
Breakfast	Ready to eat	Retail	Single serve cereal for kids

Event Scoring

ACTIVITIES	Individual Points	Team Points
Team Product Development Project		400
Written Exam	150	450
Math/Problem Solving	25	75
Food Safety and Quality	50	150
Sensory Evaluation	70	210
MAXIMUM POINTS	295	1285

TIEBREAKERS

TEAM:

1. Team Product Development
2. Individual Test (combined score)
3. Team Food Safety/Sanitation (combined score)

INDIVIDUAL:

1. Written Exam
2. Food Safety and Quality
3. Sensory Evaluation

References

The following list contains references that may prove helpful during event preparation. The most current edition of resources will be used.

Past CDE materials and other resources are available by logging in to [FFAorg](#)

EXAM REFERENCES

- **60%** of the Exam shall come from past National FFA Food Science CDE materials since and including the year 2000. These resources are available by logging into [FFAorg](#)
- Principles of Food Science, 4th edition, 2015, Janet Ward and Larry Ward, The Goodheart-Willcox Company, INC.

GENERAL TRAINING REFERENCES

- Principles of Food Sanitation, 5th Edition, 2006, Norman G. Marriott and Robert B. Gravani, Springer Science + Business Media, Inc.
- Institute of Food Technology website, <http://www.ift.org>
- USDA Food Safety and Inspection Service website, <http://www.fsis.usda.gov>
- US Food and Drug Administration, www.FDA.org *
- Penn State Kitchen Chemistry: Experiments, resources and materials for educators and students, <http://foodscience.psu.edu/public/kitchen-chemistry>
- Food Safety Education, http://www.fsis.usda.gov/food_safety_education/for_kids_&_teens/index.asp
- Partnership for Food Safety Education, <http://www.fightbac.org>
- FoodSafety.gov, <http://www.foodsafety.gov>

Forms

See Team Product Development Scorecard and Customer Inquiry Rubric below.

Team Product Development Project Scorecard

400 points

CHAPTER	STATE	TEAM NUMBER	
		Possible Score	Team Score
Package Display Components			
Use and development of nutrition label			
• Required information present		10	
• Correct calculations		10	
• Correct organization		10	
Use and development of the ingredient statement			
• Present		10	
• Correct order and all ingredients included		10	
• Location on package		10	
Use of principle display panel to convey information			
• All required components		15	
• Correct information		15	
• Location on package		10	
PACKAGE DESIGN SUBTOTAL		100	
Product Development Oral Presentation			
Cost of goods sold			
• Costing		20	
• Accuracy			
Nutrition			
• Communicate nutritional quality of product		20	
• Apply nutritional quality to health benefits			
Target audience			
• Identification of key consumer		20	
Quality control			
• Key quality attribute of consistent product		20	
• Examples: flavor, color, texture, net weight, size, etc.			
Marketing and sales			
• Communicated with future users		20	
• Promotions			
• Market location			
Product			
		20	

<ul style="list-style-type: none"> • Appearance • Texture • Shelf-life • Interaction of ingredients • Creativity 		
Processing <ul style="list-style-type: none"> • Description of how to make product • Equipment • Flow diagram, unit operations • People 	20	
Packaging <ul style="list-style-type: none"> • Materials used • Appropriate for use of product • Creativity 	20	
Food Safety <ul style="list-style-type: none"> • Discussed potential hazards/concerns associated with products 	20	
Formulation Concepts		
<ul style="list-style-type: none"> • How well did product match concept/product development scenario 	30	
<ul style="list-style-type: none"> • Category 	5	
<ul style="list-style-type: none"> • Platform 	5	
Quality of Presentation		
<ul style="list-style-type: none"> • Equitable participation of team members 	5	
<ul style="list-style-type: none"> • Organization 	5	
<ul style="list-style-type: none"> • Use of time allowed 	5	
<ul style="list-style-type: none"> • Professionalism 	5	
<ul style="list-style-type: none"> • Presence & enthusiasm 	5	
<ul style="list-style-type: none"> • Mannerisms 	5	
Product Development Oral Presentation Subtotal	250	
Response to Judges' Questions		
Team Participation in Question Response <ul style="list-style-type: none"> • All team members contributed 	25	
Quality of Response Accuracy Ability to answer Originality Knowledge	25	
Response to Judges' Questions Subtotal	50	
TOTAL POINTS	400	

Customer Inquiry Rubric (25 points)

	Points Possible	Points Earned
<p>Scenario # 1: This issue represented in this scenario is a:</p> <p><input type="checkbox"/> Food Quality Issue <input type="checkbox"/> Food Safety Issue</p>	2	
<p>Is the concern or hazard primarily (<i>Check only one</i>):</p> <p><input type="checkbox"/> Biological <input type="checkbox"/> Physical <input type="checkbox"/> Chemical</p>	3	
<p>Scenario # 2: This issue represented in this scenario is a:</p> <p><input type="checkbox"/> Food Quality Issue <input type="checkbox"/> Food Safety Issue</p>	2	
<p>Is the concern or hazard primarily (<i>Check only one</i>):</p> <p><input type="checkbox"/> Biological <input type="checkbox"/> Physical <input type="checkbox"/> Chemical</p>	3	
<p>Scenario # 3: This issue represented in this scenario is a:</p> <p><input type="checkbox"/> Food Quality Issue <input type="checkbox"/> Food Safety Issue</p>	2	
<p>Is the concern or hazard primarily (<i>Check only one</i>):</p> <p><input type="checkbox"/> Biological <input type="checkbox"/> Physical <input type="checkbox"/> Chemical</p>	3	
<p>Scenario # 4: This issue represented in this scenario is a:</p> <p><input type="checkbox"/> Food Quality Issue <input type="checkbox"/> Food Safety Issue</p>	2	
<p>Is the concern or hazard primarily (<i>Check only one</i>):</p> <p><input type="checkbox"/> Biological <input type="checkbox"/> Physical <input type="checkbox"/> Chemical</p>	3	
<p>Scenario # 5: This issue represented in this scenario is a:</p> <p><input type="checkbox"/> Food Quality Issue <input type="checkbox"/> Food Safety Issue</p>	2	
<p>Is the concern or hazard primarily (<i>Check only one</i>):</p> <p><input type="checkbox"/> Biological <input type="checkbox"/> Physical <input type="checkbox"/> Chemical</p>	3	
TOTAL	25	