

FOOD SCIENCE AND TECHNOLOGY

4 MEMBER TEAM

I. 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.

II. OBJECTIVES

1. To encourage FFA members to gain an awareness of career and professional opportunities in the field of food science and technology.
2. To provide FFA members with the opportunity to experience group participation and leadership responsibilities in a competitive food science and technology program.
3. To help FFA members develop technical competence and personal initiative in a food science and technology occupation.

III. TEAM MAKEUP

1. The team will consist of four members with all four members' scores being totaled for the team score.
2. All participants must wear FFA Official Dress for this event.
3. Non-programmable and non-graphing calculators. No other calculators are allowed to be used during the event including cell phones.
4. **ALLERGY INFORMATION:** Food products used in this event may contain or come in contact with potential allergens (dairy, peanut, wheat, etc...). Advisors must notify the provider if a team member has a food allergy.

IV. EQUIPMENT

Each participant must provide:

1. Team members must provide their own compliant clipboard and/or clean folder with the following items: scan sheet, and/or copy of the scan sheet, optional Texas FFA CDE drop sheet, and/or 2 sheets of lined or unlined blank paper.
2. Two sharpened No. 2 pencils
3. Non-programmable and non-graphing calculators. No other calculators are allowed to be used during the event.

A. TEAM PRODUCT DEVELOPMENT PROJECT

1. 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. The category, platform and market for the product development will be posted on the Texas FFA website by **January 15th** each year.
2. The team will be responsible for understanding and using the following concepts:
 - a. Formulation of product to meet specified requirements.
 - b. Package design and labeling requirements to reflect the developed product.

- c. Nutritional fact development.
 - d. Production and packaging equipment.
 - e. Quality control and safety programs, i.e., good manufacturing practices (GMP) and hazard analysis critical control points (HACCP).
 - f. Formulation and costing (ingredient, packaging, etc.).
 - g. Current food trends.
 - h. Market segments.
3. Each team will be provided with packaging materials, ingredients and necessary ingredient information in order to develop, label and package a product.
 4. 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.
 5. After this time period, each team member will contribute to a 10-minute oral presentation delivered to a panel of judges. No electronic media will be used in the presentation.
 6. Following the presentation there will be a 10-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.
 7. Total time involved for each team will be 80 minutes. Total number of points possible for this activity will be 400 points.
 8. 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.
 - a. Categories
 - Cereal
 - Snacks
 - Meals
 - Side dishes
 - Beverages
 - Supplements
 - Condiments
 - Desserts
 - b. Platform
 - Frozen
 - Refrigerated
 - Shelf-stable
 - Convenience
 - Ready to eat
 - Heat and serve
 - c. Market (domestic and international)
 - Retail
 - Wholesale
 - Food service
 - Convenience store

9. Example of scenario product from past events:
 - d. Ready to eat breakfast cereal for retail
 - e. Refrigerated frozen cookie dough for wholesale
 - f. Yogurt parfait for convenience store
 - g. Shelf stable, dried fruit snack mix for retail
10. Evaluation criteria and points for team activity can be found on the team product development project scorecard.

B. INDIVIDUAL ACTIVITIES

1. Objective Test

- a. The objective questions administered during the food science and technology examination will be designed to determine each team members understanding of the basic principles of food science and technology. The reference for the test will be from:

Principles of Food Science - 4th Edition Janet Ward and Larry Ward,
The Goodheart Wilcox Company

- i. 2017 – Chapters 1-13
 - ii. 2018 - Chapters 14-25
 - iii. 2019 - Chapters 1-13
 - iv. 2020 - Chapters 14-25
 - v. 2021 - Chapters 1-13
 - b. 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. Practicums - Each team member will complete all parts of both practicums
- a. Problem Solving/Math Practicum-25 points possible per individual.
 - i. Participants will answer a series of five mathematical calculations based on common food science themes. These questions will be developed using the USDA Food Safety Inspection Service Processing Inspector's Calculations Handbook found in the following sections: Conversions (e.g. metric, US equivalents, grams, ounces, percent, ppm, Celsius, Fahrenheit); Pearson's Square; Percent of an ingredient in a formula; Yield; Shrink loss; Volume of a container; Calorie calculations; Total energy calculations. All will be referenced at this following link:
<http://www.aamp.com/foodsafety/documents/Directive7620-3.pdf>.

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

- i. 2.4 cups
- ii. 3.2 cups
- iii. 3.4 cups
- iv. 4 cups

b. **Food Safety and Quality Practicum - 25 points**

- i. Customer Inquiry- Each participant will be given five scenarios

representing general consumer inquiries. Participants must determine if the consumer inquiry reflects a quality or safety issue (2 points per scenario) and determine if it is a biological, chemical or physical concern or hazard (3 points per scenario). (25 points)

c. Sensory Evaluation Practicum - 70 points

- i. Triangle Tests- Four 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 test is worth five points. (20 points)
- ii. Aromas- Each participant will be asked to identify 10 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 five points. (50 points)

V. SCORING

INDIVIDUAL ACTIVITIES	
Objective Test (60 minutes)	150 points
Problem Solving/Math	25 points
Food Safety and Quality Practicum <ul style="list-style-type: none"> • Customer Inquiry (25 pts) 	25 points
Sensory Evaluation <ul style="list-style-type: none"> • Triangle Tests (20 pts) • Aromas (50 pts) 	70 points
Total Individual points	270 points

TEAM ACTIVITIES	
Team Product Development Project (80 minutes)	
Package Design	100 points
Product Development	250 points
Response to Judges' Questions	50 points
Total Team Points	400 points
TOTAL INDIVIDUAL POINTS (270 pts x 4 members)	1080 points
TOTAL TEAM POINTS	1600 points

VI. TIEBREAKERS

- A. Ties for team awards will be broken using the following criteria:
1. The highest team product development project score.
 2. If still tied, then the highest number of total points earned from the objective test (adding all four team member scores) will break the tie.
 3. If still tied, the total points earned by the team in the food safety and quality practicum will be used.
 4. If still tied, the team will be accompanied by their advisor and will meet with contest officials who will conduct a coin toss to determine the higher

placing team.

- B. Ties for individual awards will be broken using the following criteria:
1. The highest objective test score will be used.
 2. If still tied, the highest food safety and quality practicum score will be used.
 3. If still tied, the individual will be accompanied by their advisor and will meet with contest officials who will conduct a coin toss to determine the higher placing individual.

REFERENCES

This list of references is not intended to be inclusive. Other sources may be utilized, and teachers are encouraged to make use of the very best instructional materials available. The following list contains references that may prove helpful during event preparation.

Principles of Food Science - 4th Edition Janet Ward and Larry Ward, The Goodheart Wilcox Company Odd years Chapters 1-13, Even years Chapters 14-25

**Food Science and Technology CDE
Team Product Development Project Scorecard – Page 1**

Area: _____ **Team #:** _____

	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		
<ul style="list-style-type: none"> • Cost of Goods Sold <ul style="list-style-type: none"> ○ Costing ○ Accuracy 	20	
<ul style="list-style-type: none"> • Nutrition <ul style="list-style-type: none"> ○ Communicate nutritional quality of product ○ Apply nutritional quality to health benefits 	20	
<ul style="list-style-type: none"> • Target Audience <ul style="list-style-type: none"> ○ Identification of key consumer 	20	
<ul style="list-style-type: none"> • Quality Control <ul style="list-style-type: none"> ○ Key quality attribute of consistent product ○ Examples: Flavor, color, texture, net weight, size, etc. 	20	
<ul style="list-style-type: none"> • Marketing & Sales <ul style="list-style-type: none"> ○ Communicated with future users ○ Promotions ○ Market location 	20	
<ul style="list-style-type: none"> • Product <ul style="list-style-type: none"> ○ Appearance ○ Shelf-life ○ Choice of ingredients ○ Creativity 	20	
<ul style="list-style-type: none"> • Processing <ul style="list-style-type: none"> ○ Description of how to make product ○ Equipment ○ Flow diagram, unit operations ○ People 	20	
<ul style="list-style-type: none"> • Packaging <ul style="list-style-type: none"> ○ Materials used ○ Appropriate for use of product ○ Creativity 	20	
<ul style="list-style-type: none"> • Food Safety <ul style="list-style-type: none"> ○ Discussed potential hazards/concerns associated with products 	20	

**Food Science and Technology CDE
Team Product Development Project Scorecard – Page 2**

Area: _____ **Team #:** _____

• Formulation Concepts		
○ How well did product match concept/product development scenario	30	
○ Category	5	
○ Platform	5	
• Quality of Presentation		
○ Equitable participation of team members	5	
○ Organization	5	
○ Use of time allowed	5	
○ Professionalism	5	
○ Presence & enthusiasm	5	
○ Mannerisms	5	
Product Development Oral Presentation Subtotal	250	
Response to Judges' Questions		
• Team Participation in Question Response ○ All team members contributed	25	
• Quality of Response ○ Accuracy ○ Ability to answer ○ Originality ○ Knowledge	25	
Response to Judges' Questions Subtotal	50	
TOTAL POINTS	400	