

FOOD SCIENCE AND TECHNOLOGY

4-Member Team

IMPORTANT NOTE

Please thoroughly read the General CDE Rules Section at the beginning of this handbook for complete rules and procedures that are relevant to State FFA Career Development Events.

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

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

III. EVENT RULES

- A. Participants must wear FFA Official Dress for this event.
- B. Any participant in possession of an electronic device/cell phone, except a calculator, in the event area is subject to disqualification.
- C. The food science and technology career development event will consist of a team product development, practicums, and objective test.
- D. All team members will participate in all of the activities. There will be a possible 1,560 total points per team.
- E. Allergy Information: Food products used in this event may contain or come in contact with potential allergens. Advisors must submit a special needs request form for participants with any allergies with certification. The event committee will make all reasonable efforts to accommodate students with food allergies.

IV. EVENT FORMAT

A. Team Make-Up

1. The team will consist of four members with all four members' scores being totaled for the team score. Incomplete teams will only be eligible for individual awards. However, the event committee will make all reasonable efforts to accommodate incomplete team events.

B. Equipment

1. Each participant can bring:
 - a. A clipboard that is clean and free of notes.
 - b. Two sharpened No. 2 pencils.
 - c. Electronic calculator- Calculators used in this event should be non-programmable and non-graphing. Calculators should have only basic

functions such as addition, subtraction, multiplication, division, equals, percent, square root, +/- key. No other calculators are allowed to be used during the event including cell phones.

2. Event Superintendent will provide:
 - a. Official Scansheet for Food Science CDE
 - b. Materials for the Team Product Development Project and Practicums

C. Event Schedule

1. Each contestant shall complete the event in the time allotted:
 - a. Objective Test (60 Minutes)
 - b. Practicums (30 Minutes)
 - c. Sensory evaluation (10 Minutes)
 - d. Team Product Development Project (70 minutes)

D. Objective Test (150 Points)

1. 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 test will be primarily, but not limited to the list of references at the end of this chapter.
2. 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 3 points, for a total of 150 points.

E. Practicums

Each Team Member will complete all parts of practicums.

1. 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 % 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
2. Food Safety and Quality Practicum- 50 points
 - a. 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 and determine if it is a biological, chemical or physical concern or hazard. (25 points)
 - b. Product Specification Compliance: Students will be given sample sets (actual products and/or data sets) and will be responsible for determining compliance with the provided specification requirements. This may include, but is not limited to, determining if the product(s) is within the net weight standards, product sizing requirements, pH, color analysis, viscosity measurement, fill level tolerances, packaging

specification compliance, etc. Participants will be asked five questions regarding potential compliance violations presented within the sample set. (25 points)

3. Sensory Evaluation Practicum- 40 points
 - a. 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. Each test is worth 5 points. (20 points)
 - b. Aromas: 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 2 points. (20 points)
 - c.

Aromas

Apple	Ginger	Peach
Banana	Grape	Peppermint
Basil	Lemon	Raspberry
Butter	Licorice (anise)	Sage
Cherry	Lime	Smoke (liquid)
Chocolate	Maple	Strawberry
Cinnamon	Molasses	Vanilla
Clove	Nutmeg	Watermelon
Coconut	Onion	Wintergreen
Coffee	Orange	
Garlic	Oregano	

F. Food Safety/Sanitation Team Activity (100 Points Possible per Team)

Each participant will be given situations (e.g., photos, videos, written scenarios, live demonstrations, or a combination). A numbered list of problems will be provided at the beginning of this practicum segment. The list will contain concepts such as good manufacturing practices (GMP), sanitation, food handling/storage and other pre-requisite programs. The team will work together to evaluate the situation and complete a safety/sanitation report evaluation which will include observations, degree of concern, recommendations/corrective actions. Students will be evaluated on teamwork as well as their safety/sanitation report.

G. Team Product Development (400 Points)

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.
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, easel sheet, and sharpies.
 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 ten 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 ten-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
 - i. Cereal
 - ii. Snacks
 - iii. Meals
 - iv. Side dishes
 - v. Beverages
 - vi. Supplements
 - vii. Condiments
 - viii. Desserts
 - b. Platform
 - i. Frozen
 - ii. Refrigerated
 - iii. Shelf-stable
 - iv. Convenience
 - v. Ready to eat
 - vi. Heat and Serve
 - c. Market (domestic and international)
 - i. Retail
 - ii. Wholesale
 - iii. Food service
 - iv. Convenience store

9. Example of scenario product from past events:
 - a. Ready to eat breakfast cereal for retail
 - b. Refrigerated frozen cookie dough for wholesale
 - c. Yogurt parfait for convenience store
 - d. Refrigerated, heat and serve pizza for retail
 - e. 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 at the end of this chapter.

2024 Product: Low-calorie cookies

V. Scoring

Activities	Individual Points	Team Points
Team Product Development Project -		400
Team Food Safety/Sanitation -		100
Math/Problem Solving	25	100
Food Safety and Quality	50	200
Sensory Evaluation	40	160
Written Exam	150	600
Maximum Points	265	1,560

VI. TIEBREAKERS

- A. **Team** - In case teams have the same total points in the overall team placing, the tie will be broken by the highest team product development project score. If this score does not break the tie, then the highest number of total points earned from the objective test (adding all four team member scores) will break the tie. If a third tiebreaker is needed, the total points earned but the team in the food safety and quality practicum will be used.
- B. **Individual** - To identify the high individual for this event in case of a tie, the highest objective test score will be used as the first tiebreaker, followed by the highest food safety and quality practicum score as the second tiebreaker. If a third tiebreaker is needed, one sensory evaluation score will be used.

VII. REFERENCES

This list of references is not intended to be all-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:

- Okstate Food Science CDE Educational Video
<https://www.youtube.com/watch?v=Aq7PHR3d68o>
- National FFA 2017-2021 Handbook (revised March 2022) and Past Tests and Practicums (Q&A) located under Event Resources: <https://www.ffa.org/participate/cdes/food-science-and-technology/>
- Mehas and Rodgers, 5th Edition, 2006. Kay Yockey Mehas and Sharon Lesley Rodgers, Glencoe/McGraw, New York.

- Food Science and Safety, 2nd Edition, 2004, George J. Seperich, Pearson Publishers
- Institute of Food Technology website, <http://www.ift.org>
- USDA Food Safety and Inspection Service website, <http://www.fsis.usda.gov>
- Penn State Kitchen Chemistry: Experiments, resources and materials for educators and students, <http://foodscience.psu.edu/public/kitchen-chemistry>
- Food Safety Education, <https://www.fsis.usda.gov/food-safety/safe-food-handling-and-preparation/food-safety-basics>
- Partnership for Food Safety Education, <http://www.fightbac.org>
- FoodSafety.gov, <http://www.foodsafety.gov>
- OSU Food Science CDE video 2 https://www.youtube.com/watch?v=k2T_6oBltsY
- <https://www.youtube.com/watch?v=fTQYEsXZKvQ>
- Arkansas Food Science Math Practicum Reference Sheet:
<https://www.arkansasffa.org/FST>

VIII. SUPPLEMENTAL MATERIALS AND FORMS

Please check the Food Science CDE Oklahoma State University site to view videos and educational materials.

- Product Development Presentation Scorecard
- Food Safety Sanitation Report Form
- Team Activity Preparation Rubric
- Customer Inquiry Rubric