

FOOD SCIENCE AND TECHNOLOGY

Updated February 12, 2021

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

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

III. Common Core References

7th Grade:

MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

8th Grade:

CCSS.ELA-Literacy.SL.8.1a Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

9-10th Grade:

HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

11-12th Grade:

CCSS.ELA-Literacy.RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

IV. Event Rules

1. Team make-up: the team will consist of four members with all four members' scores being totaled for the team score.
2. Any participant in possession of an electronic device, except a calculator, in the event area is subject to disqualification.

3. Members must be in official dress for entire contest. There will be a 10pt deduction for each member that is not in official dress as stated by the official FFA manual.

V. Event Format

1. The food science and technology career development event will consist of two rounds. Round 1: individual events (an objective test, a food safety and quality practicum and a sensory evaluation practicum). Round 2: team product development project
2. The top ten teams will advance to the second round.
3. All team members will participate in all of the activities. There will be a possible 1240 total points per team.
4. Allergy Information: Food products used in this event may contain or come in contact with potential allergens. Advisors must notify the provider of a team member has a food allergy.
5. Each participant must provide:
 - a. A transparent clipboard that is clean and free of notes.
 - b. Two sharpened No. 2 pencils.
 - c. Non-programmable and non-graphing calculators. No other calculators are allowed to be used during the event including cell phones.
 - d. Teams and/or individuals will not be permitted to use electronic media during the event. This includes but is not limited to cell phones, mp3 players, cameras, etc.
 - e. Bottled water with label removed (optional)
 - f. No outside food or drink allowed in contest, including scent refreshing substances like coffee beans.

A. Round 1: Individual Activities

1. Objective Test

- a. 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 reference for the test will be from Vaclavik, V. A. and Christian E. W. (2007) Essentials of Food Science (3rd ed.) ISBN 978-0387699394

- a) 2021 Chapters 1-5
- b) 2022 Chapters 6-10
- c) 2023 Chapters 11-15
- d) 2024 Chapters 16-20

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 2 points, for a total of 100 points.

2. *Practicums*—Each team member will complete all parts of practicums.

a. *Food Safety and Quality Practicum- 50 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 and determine if it is a biological, chemical or physical concern or hazard. (25 points)

ii. Food Safety/Sanitation- Each participant will be given ten scenarios. 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. Participants will identify if there is a violation presented in the situation. If participants decide that there is a violation, they will indicate the number of the violation from the list of problems provided. (25 points)

b. *Sensory Evaluation Practicum- 50 points*

i. Triangle Tests- Three 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 5 points. (15 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 2 points. (20 points)

Cinnamon	Grape
Chocolate	Garlic
Maple	Peppermint
Oregano	Clove
Basil	Nutmeg
Lemon	Ginger
Lime	Molasses
Orange	Wintergreen
Vanilla	Banana
Smoke (liquid)	Coconut
Cherry	Lilac
Pine	Raspberry
Onion	Strawberry
Butter	Licorice (anise)
Menthol	

B. Round 2: 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 sent by email to the New Mexico FFA list-serve by March 1st.
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 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 ten minute oral presentation delivered to a panel of judges. No electronic media will be used in the presentation.
6. Following the presentation up to 10 minutes will be provided for a 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 up to 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 the following categories, platforms and markets listed below on rotation.
 - a. Categories
 - Condiments - 2021
 - Desserts - 2022
 - Cereal – 2023
 - Snacks – 2024
 - Meals – 2025
 - Side dishes – 2026
 - Beverages 2027
 - Supplements- 2028

- 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:
- 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. Refer to National FFA rules for official scorecards that will be used in the contest.

VI. Scoring

Individual Activities

Official Dress	10
Objective Test (60 minutes)	100
Food Safety and Quality Practicum	50
<ul style="list-style-type: none"> • Customer Inquiry • Food Safety/Sanitation 	
Sensory Evaluation	35
<ul style="list-style-type: none"> • Triangle Tests • Aromas 	
Total Individual Points	195
Team Product Development Project (80 minutes)	400
Package Design	100
Product Development	250
Response to Judges' Questions	50

Individual Points (195 pts x 4 members = 780) + Team Project (400) =
TOTAL TEAM POINTS 1180

VII. Tiebreakers

1. See General Rules

VIII. 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.

- Vaclavik, V. A. and Christian E. W. (2007) Essentials of Food Science (3rd ed). ISBN 978-0387699394
- Institute of Food Technology website, <http://www.ift.org>
- USDA Food Safety and Inspection Service website, <http://www.fsis.usda.gov>
- 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>
- National FFA Food Science and Technology CDE resources,
https://www.ffa.org/documents/cde_fst_2012.pdf