

Milk Quality and Products

A Special Project of the South Dakota FFA Foundation

Important Note: Please thoroughly read the General Rules at the beginning of this handbook for complete rules and procedures that are relevant to all South Dakota FFA Career Development Events.

Purpose

The purpose of the Milk Quality and Products Career Development Event is to promote practical learning activities in milk quality and dairy products, as well as assisting students in developing team decision-making skills.

Objectives

- Utilize knowledge of milk quality.
- Utilize knowledge of milk pricing.
- Utilize knowledge of the composition and quality characteristics of raw and pasteurized milk and milk products.
- Understand the causes and control of mastitis, its influences on milk quality and cheese yield and the use of mastitis detection methods in controlling the disease.
- Identify cheese varieties and characterize properties.
- Identify flavor defects and evaluate milk quality.

Event Rules

Teams will consist of three or four members.

The top three individual scores will be used to determine the final team score.

Event Format

Milk Flavor Identification and Evaluation – 120 points

Ten milk samples will be scored on flavor (taste and odor). Six points will be awarded for the correct identification, six points will be awarded for correct flavor score.

All samples of milk are prepared from pasteurized milk intended for table use and will score 1 to 10 based on the below scoring guide:

Milk Flavor Scoring Guide 1

Numerical Score	Quality
10	Excellent
8 or 9	Good
5 to 7	Fair
2 to 4	Poor
1	Unacceptable/Un-salable

Participants are to use whole numbers when scoring "Flavor" of milk. Check only the one most serious defect in a sample even if more than one flavor is detected. If no defect is noted, assign a score of "10." (See scoring guide below)

Milk Flavor Scoring Guide 2

Reasons for Deductions	Scores
No Defect	10
Acid	2
Bitter	3
Feed	8
Flat/Watery	8
Foreign	3
Garlic/Onion	3
Malt	3
Oxidized	4
Rancid	2
Salty	6

Apples or saltwater will be allowed for refreshing. Only those cups provided at the event may be used.

45 minutes will be allowed to complete the three identification areas (cheeses, milk sensory and dairy/non dairy)

Cheese Identification – 100 points

Ten cheese samples for identification will be selected from those listed below.

Cubes of the cheese will be available for tasting.

Note: More than one sample of a given cheese may be used.

A score of four points is given for each variety correctly identified. Remaining points will be made up by correctly matching cheese matrix.

Uncolored cheeses may be used.

Possible cheeses include:

Blue/Bleu	Brie	Cheddar (Mild)
Cheddar (Sharp)	Colby	Cream
Feta	Gouda	Havarti
Gruyere	Monterey Jack	Mozzarella
Muenster	Parmesan	Processed American
Provolone	Queso Fresco	Ricotta
Romano	Swiss	

45 minutes will be allowed to complete the three identification areas (cheeses, milk sensory and dairy/nondairy)

In addition to identifying cheese samples, participants will classify characteristics of identified cheeses using the following matrix. Participants will have six characteristics to select based on the ten identified cheese samples (60 points possible).

Cheese Characteristics Matrix: A description of major varieties of cheeses popular among American consumers						
Variety	Moisture (%) (Max)¹	Fat (%) (Min)²	Pasta Filata³	Brine/Surface Salted	Ripened by	Origin
Blue/Bleu	46	50	No	Yes	Mold	France
Brie	52.5	20	No	No	Bacteria and mold	France
Cheddar	39	50	No	No	Bacteria	England
Colby	40	50	No	No	Bacteria	US
Cream	55	33	No	No	Unripened	US
Feta	60	42	No	Yes	Bacteria	Greece
Gouda	45	48	No	Yes	Bacteria	Netherlands
Havarti	54	30	No	No	Bacteria	Denmark
Guyere	39	45	No	Yes	Bacteria	Switzerland
Monterey Jack	44	50	No	No	Bacteria	US
Mozzarella	60	45	Yes	Yes	Bacteria	Italy
Muenster	46	50	No	No	Bacteria	France
Parmesan	32	32	No	Yes	Bacteria	Italy
Processed American	40	50	No	No	Bacteria	US
Provolone	45	45	Yes	Yes	Bacteria	Italy
Queso Fresco	59	18	No	No	Unripened	Mexico
Ricotta	73	4	No	No	Unripened	Italy
Romano	34	38	No	Yes	Bacteria	Italy
Swiss	41	43	No	Yes	Bacteria	Switzerland

¹Some cheeses have a range in moisture permitted, but these are the highest permitted amounts.

²Some cheese standards use percentage by weight of total solids (e.g., Cheddar) while other use percentage by weight of the cheese (e.g., Cream).

³Curd is stretched in hot water to align the protein molecules and provide stretch to the curd.

An example cheese characteristic problem:

The six items in the "characteristics" column are based on the information found in the Cheese Characterization Matrix. Cheese samples are from the cheese identification activity. Participants will select all characteristics that apply to each sample. Answers will be recorded on the event- specific scan form. Characteristics in the problem can change each year.

Characteristics	Sample Numbers				
	1 (Cheddar)	2 (Cream)	3 (Swiss)	4 (Mozzarella)	5 (Bleu)
A. Maximum moisture = 39%	X				
B. Minimum fat in the solids = 33%		X			
C. Receives "pasta filata treatment"				X	
D. Salted in brine				X	

E. Ripened by molds					X
F. Originated in England	X				

Product Identification- Dairy versus Non-Dairy – 100 points

Ten samples of fresh fluid milk products will be identified according to their content of milk fat.

The following products may be included among the samples:

Dairy Products: nonfat (skim) milk (.05%), lowfatmilk (1.0%), reduced fat milk (2%), milk (3.25%), half and half (10.5%), butter (80%), sour cream (18%), flavored milk (0.05%–3.25%) light whipped cream (30%), heavy cream (36%).

Non-Dairy Products: margarine, non-dairy creamer, non-dairy sour cream, non-dairy milk, non-dairy flavored beverage and non-dairy whipped topping. All of these are to be categorized as non-dairy fat.

California Mastitis Test – 10 points

This will be completed as a team, but each individual marks his/her scorecard and gets points toward his/her individual score.

One hour will be allowed for the team problem solving and CMT test.

One sample should be scored with CMT score as shown:

CMT Score	Appearance
0	Mixture liquid, no precipitate
2	Slight precipitate tends to disappear with paddle movement
4	Distinct precipitate, but does not gel
6	Distinct gel formation
8	Strong gel formation tends to adhere to paddle. Forms distinct central peak.

Individual Test – 120 points

Test will consist of 60 true/false or multiple-choice questions valued at 2 points per question.

The test will be given in two parts with one part consisting of 30 questions on quality milk production and a second part of 30 questions on milk marketing.

45 minutes will be allowed for the written test.

Team Activity – 100 points

The team activity will consist of a problem-solving activity consisting of five multiple choice questions. Concepts to be tested include:

- Principles of merchandising dairy foods
- Factors impacting the demand for and commercial use of milk and dairy food products
- Nutritional value of dairy products and their role on the diet

- Current issues relative to the marketing of milk and dairy products, and new developments in dairy food processing
- Troubleshooting to determine problems/causes affecting milk quality

One hour will be allowed for the team problem solving and CMT test.

Scoring

The event will be scored as follows:

	Possible Points
Ten Milk Samples – Flavor Score	60 points
Ten Milk Samples – Flavor Defects	60 points
Cheese Identification	40 points
Cheese Characteristics	60 points
Product Identification-Dairy vs. Non-Dairy	100 points
California Mastitis Test	10 points
Milk Production & Marketing Questions (Individual Test)	120 points
Total Possible Individual Score	450 points
Team Activity Problem Solving	100 points
Total Possible Team Score (3 participants count)	1450 points

Tiebreakers

In the case of a team tie, the order to break the tie will be:

1. Total Team Milk Flavor Score
2. Team Problem Score

In the case of an individual tie, the order to break the tie will be:

1. Individual Written Exam Score
2. Individual Cheese Identification Score

Recommended References

- National FFA Core Catalog – Past CDE Materials
- *Using the California Mastitis Test*. University of Missouri-Columbia Extension Division. Single copy free, contact for price quote for multiple copies. Address: Columbia, MO 65211.
- California Mastitis Test. Order from: NASCO. Address: 901 Janesville Ave., Fort Atkinson, WI 53538. Cost: \$11.00, catalog number: 06059N. Toll-free Phone: (800) 558-9595 or (414)563-2446.
- Dairy Outlook and Situation Report (five issues per year). May be obtained for a cost of \$8.00 per year by sending check or money order to: Superintendent of Documents, Government Printing Office, Washington D.C. 20402. Use issues beginning with August of previous year and ending with July of year of event.
- *Dairy Foods Curriculum Packet*. From: Dairy Science Department, South Dakota State University. Developed by: Sheri L. Kahnke and Dr. Robert J. Baer, South Dakota State University, Brookings, SD 57007-0647.