

Milk Quality and Products

CDE

(rev. Oct 2019)

Purpose

The purpose of the FFA 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. The focus of the FFA Milk Quality and Products Career Development Event is raw milk quality, federal milk marketing orders and attributes of selected milk products. The four general areas that contribute to milk quality and consumer demand are:

- Milk production.
- Milk quality and safety.
- Milk processing or manufacturing.
- Raw milk marketing.

Eligibility

The participant must be an active member of a chartered Delaware FFA Chapter and enrolled in grades 9, 10, 11, or 12. (Team structure). The middle school division is offered for those FFA Members in 6-8th grades. This is an abbreviated version of the high school CDE.

Event Procedures

- A. Team make-up- Teams will consist of four members. Team ranking is determined by combining the scores of all team participants. Teams that have fewer than four members are not eligible for team awards, but students may receive individual awards. State Staff must be notified at least 2 weeks in advance of any food allergies. If notified after this time, they will not be accommodated and will have to use visual evaluation for that category.
- B. All participants must be in official FFA dress for this event.
- C. Participants will be allowed approximately 2 hours and 40 minutes for the event.
- D. Participants are not to use strong deodorant, perfume, chewing gum or other detractors to the taste and smell senses.
- E. Any participant in possession of an electronic device in the event area is subject to disqualification.
- F. Students must include their ID (Team number and individual number) on their scantron sheet. Care must be taken with these forms, any form that is unreadable by the scantron machine will not be scored.

Event Format

A. Equipment

1. Materials to be provided by the student: two no. 2 pencils.
2. Team should bring a CMT kit.

3. Optional: a non-programmable calculator (cell phones are not permitted), bottled water (plastic container), and an apple. Materials Provided: All paper and other supplies will be provided. Participants are not to bring clipboards, paper, etc., to the event. Participants are not to bring glass of any kind to the event.
4. Event staff will provide a folder for each participant with their scantron sheet. Writing on the folder is not permitted. All efforts should be made not to alter the scantron, wrinkle, or curl the scantron sheet. Stray marks should be removed. No clipboards are permitted.

B. Individual Activities

1. Milk Flavor Identification and Evaluation -20 min
 - Ten milk samples will be scored on flavor (taste and odor). All samples of milk are prepared from pasteurized milk intended for table use and will score 1 to 10. Please note scoring guide.
 - 120 POINTS, 6 POINTS FOR FLAVOR ID, 6 POINTS FOR INTENSITY SCORE)
 - Participants are to use whole numbers when scoring ‘flavor’ of milk. Check only the most serious milk flavor defect in a sample even if more than one flavor is detected. If no defect is noted, check “No Defect” and score as a ten (10).

Quality Basis Scoring Guide

Score	Flavor Quality
10	Excellent (no defect)
8 to 9	Good
5 to 7	Fair
2 to 4	Poor
1	Unacceptable / un-salable

DEFECTS	SCORES*		
	Slight	Definite	Pronounced
Acid	3	2	1
Bitter	5	3	1
Feed	9	8	5
Flat/Watery	9	8	7
Foreign	5	3	1
Garlic/Onion	5	3	1
Malty	5	3	1
No defect	10	10	10
Oxidized	6	4	1
Rancid	4	2	1
Salty	8	6	4

*Suggested scores are given for 3 intensities of flavor. All numbers within the range may be used. Intermediate numbers may also be used.

2. Product Identification– 20 minutes

Dairy vs Non-Dairy (100 POINTS, 6 POINTS IDENTIFICATION, 4 POINTS FAT CONTENT 10 samples)
The following products may be included among the samples:

Dairy Products: nonfat (skim) milk (.05%), lowfat milk (1.0%), reduced fat milk (2%), milk (3.25%), half and half (10.5%), butter (80%), sour cream (18%), flavored milk (6.05%-3.25%) light whipped cream (30%), heavy cream (36%)

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

3. California Mastitis Test -20 min

•Samples should be scored using even numbers from 0 – 8 inclusive. 8 points per sample.

Five samples of milk will be evaluated for abnormality, using the California Mastitis Test method.

NO MEASURING TOOLS AT ALL. ,

4. Cheese Identification - 20 minutes

Ten cheese samples for identification will be selected from those listed. Cubes of the cheeses 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. Uncolored cheeses may be used. (100 points possible)

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. An example cheese characteristic problem can be found in the reference section of this handbook. (60 points possible).

5. Written Exam—40 minutes-120 points

The written exam will be comprised of 60 questions taken from the last three years of National CDEs. The test will be given in two parts with one part consisting of thirty (30) questions on quality milk production and a second part of thirty (30) questions on milk marketing.

6. Problem Solving-40 minutes 100 points

The problem solving test will consist of a total of 20 critical-thinking, multiple choice questions. Topics may include, but are not limited to:

- Decisions about the quality and acceptability of milk.
- Calculations of the value of milk and components of milk.
- Decisions about components of milk and milk products (including processing procedures).
- Decisions about the use of chemicals in cleaning and sanitizing operations.

C. Team Activity –20 minutes

Teams may have to perform the acceptability tests or analyze test results given. 100 points for team activity.

Examples of acceptability tests include:

- Recent producer history
- Percent TA (acidity)
- DMSCC (Direct Microscopic Somatic Cell Count)
- SPC (Standard Plate Count)
- PI count (Preliminary Incubation Count)
- Antibiotic screening test
- Sample temperature
- Sample freezing point
- Equipment
- Sanitation
- Food Safety

Teams will answer questions pertaining to the test results they are analyzing or given. The questions may include regulations that pertain to any of the tests.

CMT Test Score	Appearance	Participant Score	* Somatic Cell Count
Negative	Mixture liquid, no precipitate	0	0
T	Slight precipitate tends to disappear with paddle movement	2	200-300,000
1	Distinct precipitate but does not gel	4	400-500,000
2	Distinct gel formation	6	1,200,000 – 1,500,000
3	Strong gel formation, which tends to adhere to paddle. Forms distinct central peak	8	Over 5,000,000

ACTIVITY	Points/ Sample	Samples	Individual Points	Team Points
Milk flavor ID and Scoring	12 points/ sample	10 samples	120	480
Product ID	10 points/ sample	10 samples	100	400
CMT	8 points/ sample	5 samples	40	160
Cheese type ID	10 points/ sample	10 samples	100	400
Problem Solving		20 questions	100	400
Written Exam		60 questions	120	480
Total Possible Individual Points			580	2,320
Team Activity				100
TOTALPOINTS PER TEAM				2,420

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.

1. National FFA Core Catalog; National Career Development Event Questions and Answers—<http://shop.ffa.org/cde-qas-c1413.aspx>
2. Hoard’s Dairyman, PO Box 801, Fort Atkinson, Wisconsin 53538. Phone (414) 563-5551. Issues used are from September of previous year to August of current year.
3. *Using the California Mastitis Test* published by the University of Missouri-Columbia Extension Division, Columbia, Missouri 65211. (Single copy free, write for price quote for multiple copies).
4. California Mastitis Test can be ordered from NASCO. Toll free 1-800-558-9595 or toll call, 1-414-563-2446. NASCO, 901 Janesville Avenue, Fort Atkinson, WI 53538.
5. The Cheese Reporter (Publication Number: ISSN 0009-2142), published weekly by Cheese Reporter Publishing Co., Inc. 4210 Washington Ave., Madison, WI 53704. Phone (608) 246-8430, Fax (608) 246-8431.
6. *Dairy Facts* – International Dairy Foods Association, 1250 H Street, N.W. Suite 900, Washington, DC 20005. Phone – 202-732-4332– www.idfa.org
7. Agricultural Marketing Service – www.ams.USDA.gov
8. *Judging and Scoring Milk and Cheese, Farmers bulletin # 2259*, United States Department of Agriculture, Washington DC, 20250. Phone 202-447-7473.
9. *Judging, Identifying and Scoring Dairy Products – Bulletin J250c*, University of Illinois, 1401 S. Maryland Drive, Urbana, IL 61801; Phone – 217-333-3871.
10. *Dairy Foods: Producing the Best*, Dr. Robert Marshall; Instructional Materials Laboratory, 1400 Rock Quarry Road, Q139, University of Missouri; Columbia, MO 65211
11. The Dairy Practices Council: Guidelines – www.dairypc.org
 1. #21 – Raw Milk Quality Tests (\$4)
 2. #24 – Troubleshooting High Bacteria Counts of Raw Milk (\$5)
 3. #38 – Preventing Off-Flavors and Rancid Flavors in Milk (\$6)
12. Pasteurized Milk Ordinance – <http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/MilkSafety/NationalConferenceonInterstateMilkShipmentsNCIMS-ModelDocuments/default.htm>
13. Code of Federal Regulations Title 21, Part 133 – Cheeses and Related Cheese Products –<http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcft/CFRSearch.cfm?CFRPart=133>

Tiebreakers

If ties occur, the following events will be used in order to determine award recipients:

Team

1. Team activity
2. Exam score totals

Individual

1. Exam
2. Sum of milk flavors, CMT and Cheese ID

Awards

Awards will be presented during a session at the Delaware FFA State Convention. In a team event, the top 3 individuals in the state will be recognized on stage. The winning team will be awarded a plaque.

Cheese Characteristics Matrix

A description of major varieties of cheeses popular among American consumers.

VARIETY	Moisture (%) (Maximum) ¹	Fat (%) (Minimum) ²	Pasta Filata ³	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 Mild	39	50	no	no	bacteria	England
Cheddar Sharp	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
Gruyere	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 others 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

Cheese Characterization Example Problem

The six items in the “characteristics” column are based on the information found in the Cheese Characterization Matrix in this handbook. 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				

Milk Defect Contaminates

Acid	Buttermilk
Bitter	Quinine sulfate, aspirin, tonic water
Feed	Alfalfa hay, silage, turnips, pineapple juice
Flat/Watery	Water
Foreign	Vanilla, black walnut extract
Garlic/Onion	Garlic or onion powder, chips
Malty	Grape-nuts or Carnation Malt or Ovaltine Malt
Oxidized	Expose to sunlight
Rancid	Blue Cheese
Salty	Table salt

Milk Quality and Products CDE– Junior Division

(rev. Oct 2016)

Purpose

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- Raw milk marketing.

Eligibility

The participant must be an active member of a chartered Delaware FFA Chapter and enrolled in grades 9, 10, 11, or 12. (Team structure). There is a middle school division offered for those FFA Members in 7-8th grades. This is an abbreviated version of the high school CDE.

Event Procedures

- A. Team make-up- Teams will consist of four members. Team ranking is determined by combining the scores of all team participants. Teams that have fewer than four members are not eligible for team awards, but students may receive individual awards.
- B. All participants must be in official FFA dress for this event.
- C. Participants will be allowed 2 hours and 40 minutes for the event.
- D. Participants are not to use strong deodorant, perfume, chewing gum or other detractors to the taste and smell senses.
- E. Any participant in possession of an electronic device in the event area is subject to disqualification.
- F. Students must include their ID (Team number and individual number) on their scantron sheet. Care must be taken with these forms, any form that is unreadable by the scantron machine will not be scored.

Event Format

A. Equipment

1. Materials to be provided by the student: two no. 2 pencils.

3. Optional: cell phones are not permitted, bottled water (plastic container), and an apple.
3. Materials Provided: All paper and other supplies will be provided. Participants are not to bring clipboards, paper, etc., to the event. Participants are not to bring glass of any kind to the event.
4. Event staff will provide a folder for each participant with their scantron sheet. Writing on the folder is not permitted. All efforts should be made not to alter the scantron, wrinkle, or curl the scantron sheet. Stray marks should be removed. No clipboards are permitted.

B. Individual Activities

1. Milk Flavor Identification and Evaluation -20 min
 - Ten milk samples will be scored on flavor (taste and odor). All samples of milk are prepared from pasteurized milk intended for table use and will score 1 to 10. Please note scoring guide.
 - Participants are to use whole numbers when scoring ‘flavor’ of milk. Check only the most serious milk flavor defect in a sample even if more than one flavor is detected. If no defect is noted, check “No Defect” and score as a ten (10).

Quality Basis Scoring Guide	
Score	Flavor Quality
10	Excellent (<i>no defect</i>)
8 to 9	Good
5 to 7	Fair
2 to 4	Poor
1	Unacceptable / un-salable

Example: Milk Flavor Scores*			
Defects	Slight	Definite	Pronounced
Acid	3	2	1
Bitter	5	3	1
Feed	9	8	5
Flat/Watery	9	8	7
Foreign	5	3	1
Garlic/Onion	5	3	1
Malty	5	3	1
Oxidized	6	4	1
Rancid	4	2	1
Salty	8	6	4

*Suggested scores are given for 3 intensities of flavor. All numbers within the range may be used. Intermediate numbers may also be used.

2. 2. Product Identification– 20 minutes

Dairy vs Non-Dairy (100 POINTS, 6 POINTS IDENTIFICATION, 4 POINTS FAT CONTENT 10 samples)

The following products may be included among the samples:

Dairy Products: nonfat (skim) milk (.05%), lowfat milk (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 flavored beverage and non-dairy whipped topping all of these are to be categorized as non-dairy fat

3. Cheese Identification - 20 minutes
 - Ten cheese samples for identification will be selected. More than one sample of a given cheese may be used.
4. Team Activity (Written Exam)—40 minutes
 - The written exam will be comprised of 60 questions taken from the last three years of National CDEs. The test will be given in two parts with one part consisting of thirty (30) questions on quality milk production and a second part of thirty (30) questions on milk marketing.

Scoring

The event will be divided in the following sections and scored as follows:

The scantron sheets are included so that students will have a familiarity prior to the event.

Phase	Possible Max
Individual Activities	
Milk Flavor ID and Evaluation	120
Product ID (10samples @ 10 points each)	100
Cheese Identification– 10 samples (10 samples @ 10points each)	100
Team Activity	
Written Exam	120
Total Possible Individual Points	270
Total maximum points per team (top 4 individual’s scores plus team activity score)	1200

Tiebreakers

If ties occur, the following events will be used in order to determine award recipients:

- Team
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- Individual
1. Exam
 2. Sum of milk flavors and Cheese ID

Awards

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