

Milk Quality and Products



CDE Handbook

MILK QUALITY AND PRODUCTS

New 2020

1. Purpose

The purpose of the Milk Quality and Products CDE is to promote practical learning activities in milk production, product quality and safety, raw milk marketing, and facility operations.

2. Objectives

This event will provide participants the ability to:

- a. Recognize causes of off flavors in milk and milk quality.
- b. Utilize knowledge of milk pricing.
- c. Utilize knowledge of composition and quality characteristics of raw and pasteurized milk and milk products.

3. Rules

- a. Each chapter may enter a team of three to five participants or one or two individuals.
- b. Team scores will be determined by totaling the three highest individual scores.
- c. Utensils for sampling will be provided (cups, spoons, etc.).
- d. Apples will be allowed for taste bud refreshing. Participants may use their own cups if desired.

4. Format

- a. Milk samples to be scored on quality (Identification and Evaluation)
 1. Ten (10) Milk samples will be provided for Identification of flavor/odor and scored for intensity.
 2. For each sample the participant must bubble in one oval identifying the defect and bubble in one oval giving the sample a score of intensity (1 to 10) using only the numbers found on the chart below.
 3. All samples of milk are prepared from pasteurized milk intended for table use.
 4. Milk samples will be tempered to 60 degrees F.
 5. Use whole numbers when scoring "Flavor and Odor" of milk.
 6. Check only the one most serious defect in a sample even if more than one flavor or odor is detected.
 7. For example: If no defect is noted, bubble the oval "No defect" and score the sample "10".
 8. Five (5) points for milk flavor and five (5) points for milk score for a total of 100 points.

<u>Defect</u>	<u>Slight</u>	<u>Definite</u>	<u>Pronounced</u>
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

b. Cheese Identification/Characteristics

Ten Cheese samples for identification will be selected from those listed.

1. Cubes of the cheeses will be available for tasting. Use toothpicks do not handle cheese.
2. Cheeses to be identified include: Bleu, Brie, Cheddar Mild, Cheddar Sharp, Cream/Neufchatel, Edam/Gouda, Monterey Jack, Mozzarella, Processed American, Provolone, Swiss, Colby, Feta, Havarti, Gruyere, Muenster, Parmesan, Queso Fresco, Ricotta, Romano
3. The cheese characteristic matrix and reference table are below.
4. Five (4) points per sample for cheese ID and six (6) points per sample for characteristics.

Cheese Characteristics Matrix

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 & 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

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

2. Some cheese standards use percentage by weight of total solids (e.g., cheddar) while others use percentage by weight of the cheese (e.g., cream)
3. Curd is stretched in hot water to align the protein molecules and provide stretch to the curd.

Cheese Characteristic Reference Table

(This is just an example-other characteristic can be used)

A.	Maximum moisture=39%	Any cheese with a maximum moisture of 39% or less you would bubble in "A".
B.	Minimum fat in the solids=33%	Any cheese with a minimum fat in the solids of 33% or less you would bubble in "B".
C.	Receives "pasta filata treatment"	If the cheese receives this treatment bubble in "C".
D.	Salted in Brine	If the cheese is salted in brine bubble in "D".
E.	Ripened by molds	If the cheese is ripened by mold bubble in "E".
F.	Originated in England	If the cheese originated in England bubble in "F".

**Each cheese may have more than one characteristic bubbled in. **

c. California Mastitis Test

1. Five milk samples to be evaluated using the California Mastitis test method
2. Score the California Mastitis test using even numbers from 0 to 8 inclusive.
3. See the National Career Development Events handbook for the scoring guide for this section of the event.
4. Eight (8) points per sample for a total of 40 points.

d. Written Test

1. Twenty-five objective type questions on milk production and twenty-five on milk marketing.
2. 100 points.

e. Problem Solving--Individual

1. Apply concepts involved in decision making processes to answer questions about the dairy foods industry based on supplied information. (Answer questions that require a problem to be solved).
2. Time - 18 minutes.
3. 20 questions, 5 points per question.

f. Product Identification — Dairy versus Non-Dairy (100 points — 6 points identification, 4 points fat content)

1. A total of 10 samples consisting of dairy and non-dairy products will be identified and assigned a milk-fat content score.
2. The following products may be included among the samples:
 - a. 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%).

b. 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.

g. Team

1. Team activity in which all team members' work together to solve a selected situation from one of the following: sanitation, marketing and distribution and current issues in dairy health.
2. Fifty (50) points

5. Resources

- a. See the National Career Development Events handbook for details on this activity.
- b. Recommended references to study for the event are listed in the National FFA Career Development Events Handbook. General livestock and dairy production references available in most agricultural education departments should be helpful also.

6. Scoring

Activity	Individual Points	Team Points
Milk Samples	100	300
Cheese ID/Characteristics	100	300
California Mastitis Test	40	120
Written Test	100	300
Problem Solving-Individual	100	300
Product Identification-Dairy vs. Non-Dairy	100	300
Team event		50
Total Points	540	1670

7. Awards

a. Individual

3. Individual scores will be tabulated (and do not include the team activity) and broken into gold, silver, and bronze award areas.
4. Individual ties will not be broken.
5. The high individual receives the "baby bison" trophy and a \$100 stipend.

b. Team

1. Team scores will be tabulated by adding the top three member scores and the team activity. They will be broken into gold, silver, and bronze.
2. The high team shall be eligible to represent North Dakota in the National career development event. The high team receives the traveling trophy and travel stipends from the ND FFA Foundation to participate in the National Event.
3. Team Tie Breakers: 1) Written Test; 2) Milk ID & Evaluation; 3) Cheese ID.



ND FFA - DAIRY FOODS CONTEST – CALIFORNIA MASTITIS TEST (CMT)

Contestant's No.	Contestant's Name																				
(8 points)	SAMPLE NUMBER								TOTAL												
	1	2	3	4	5	6	7	8													
Contestant's score																					
Official Score *																					
Grade difference *																					
Score even numbers only. Score each sample on "Contestant's score" line. * Do not write on lines marked "Official score" and "Grade difference". <table><tr><td><u>CMT Score</u></td><td><u>Contestant Score</u></td></tr><tr><td>Negative.....</td><td>0</td></tr><tr><td>Trace.....</td><td>2</td></tr><tr><td>1</td><td>4</td></tr><tr><td>2</td><td>6</td></tr><tr><td>3</td><td>8</td></tr></table>										<u>CMT Score</u>	<u>Contestant Score</u>	Negative.....	0	Trace.....	2	1	4	2	6	3	8
<u>CMT Score</u>	<u>Contestant Score</u>																				
Negative.....	0																				
Trace.....	2																				
1	4																				
2	6																				
3	8																				



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Contestant's No.	Contestant's Name																				
(8 points)	SAMPLE NUMBER								TOTAL												
	1	2	3	4	5	6	7	8													
Contestant's score																					
Official Score *																					
Grade difference *																					
Score even numbers only. Score each sample on "Contestant's score" line. * Do not write on lines marked "Official score" and "Grade difference". <table><tr><td><u>CMT Score</u></td><td><u>Contestant Score</u></td></tr><tr><td>Negative.....</td><td>0</td></tr><tr><td>Trace.....</td><td>2</td></tr><tr><td>1</td><td>4</td></tr><tr><td>2</td><td>6</td></tr><tr><td>3</td><td>8</td></tr></table>										<u>CMT Score</u>	<u>Contestant Score</u>	Negative.....	0	Trace.....	2	1	4	2	6	3	8
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Contestant's No.	Contestant's Name																				
(8 points)	SAMPLE NUMBER								TOTAL												
	1	2	3	4	5	6	7	8													
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Negative.....	0																				
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ND FFA - DAIRY FOODS CONTEST – CALIFORNIA MASTITIS TEST (CMT)

Contestant's No.	Contestant's Name																				
(8 points)	SAMPLE NUMBER								TOTAL												
	1	2	3	4	5	6	7	8													
Contestant's score																					
Official Score *																					
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Score even numbers only. Score each sample on "Contestant's score" line. * Do not write on lines marked "Official score" and "Grade difference". <table><tr><td><u>CMT Score</u></td><td><u>Contestant Score</u></td></tr><tr><td>Negative.....</td><td>0</td></tr><tr><td>Trace.....</td><td>2</td></tr><tr><td>1</td><td>4</td></tr><tr><td>2</td><td>6</td></tr><tr><td>3</td><td>8</td></tr></table>										<u>CMT Score</u>	<u>Contestant Score</u>	Negative.....	0	Trace.....	2	1	4	2	6	3	8
<u>CMT Score</u>	<u>Contestant Score</u>																				
Negative.....	0																				
Trace.....	2																				
1	4																				
2	6																				
3	8																				



ND FFA DAIRY FOODS CONTEST – MILK FLAVOR

NORTH DAKOTA

Contestant's No.		Contestant's Name									
DEFECTS	SAMPLE NUMBER										TOTAL GRADES
	1	2	3	4	5	6	7	8	9	10	
Contestant score											
Official Score *											
Grade Difference *											
Grade on Defects *											
Bitter											
Feed											
Flat-watery											
Foreign											
Garlic or Onion											
Acid											
Malty											
Metallic/Oxidized											
Rancid											
Salty											
No Defect											
TOTAL SCORE											

No Defects – 10 points

Sample Intensity Range – 1-10

(Defects Valued at 2 points each)

* Do not write in spaces labeled "Official Score", "Grade Difference", or "Grade on Defects".

Identify the correct milk flavor with an (X) and score the sample intensity on the "Contestants Score" line



ND FFA DAIRY FOODS CONTEST – MILK FLAVOR

NORTH DAKOTA

Contestant's No.		Contestant's Name									
DEFECTS	SAMPLE NUMBER										TOTAL GRADES
	1	2	3	4	5	6	7	8	9	10	
Contestant score											
Official Score *											
Grade Difference *											
Grade on Defects *											
Bitter											
Feed											
Flat-watery											
Foreign											
Garlic or Onion											
Acid											
Malty											
Metallic/Oxidized											
Rancid											
Salty											
No Defect											
TOTAL SCORE											

No Defects – 10 points

Sample Intensity Range – 1-10

(Defects Valued at 2 points each)

* Do not write in spaces labeled "Official Score", "Grade Difference", or "Grade on Defects".

Identify the correct milk flavor with an (X) and score the sample intensity on the "Contestants Score" line



ND FFA

Milk Fat Content of Fresh Milk Products

Contestant No.	Contestant Name
Chapter	SCORE

The samples may include: nonfat (skim) milk, reduced fat milk (2%), milk (3.3%), half and half (10.5%), coffee cream (18%) or whipping cream (30%). Identify the fluid milk products according to their content of milk fat.

CIRCLE THE CORRECT ANSWER

Sample 1	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 2	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 3	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 4	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 5	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%



ND FFA

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Contestant No.	Contestant Name
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The samples may include: nonfat (skim) milk, reduced fat milk (2%), milk (3.3%), half and half (10.5%), coffee cream (18%) or whipping cream (30%). Identify the fluid milk products according to their content of milk fat.

CIRCLE THE CORRECT ANSWER

Sample 1	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 2	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 3	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 4	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 5	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%



ND FFA

Milk Fat Content of Fresh Milk Products

Contestant No.	Contestant Name
Chapter	SCORE

The samples may include: nonfat (skim) milk, reduced fat milk (2%), milk (3.3%), half and half (10.5%), coffee cream (18%) or whipping cream (30%). Identify the fluid milk products according to their content of milk fat.

CIRCLE THE CORRECT ANSWER

Sample 1	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 2	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 3	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 4	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 5	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%



ND FFA

Milk Fat Content of Fresh Milk Products

Contestant No.	Contestant Name
Chapter	SCORE

The samples may include: nonfat (skim) milk, reduced fat milk (2%), milk (3.3%), half and half (10.5%), coffee cream (18%) or whipping cream (30%). Identify the fluid milk products according to their content of milk fat.

CIRCLE THE CORRECT ANSWER

Sample 1	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 2	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 3	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 4	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%
Sample 5	A. Skim	B. 2%	C. 3.3%	D. 10.5%	E. 18%	AB. 30%

Milk Quality and Products
Form #479-6

Incorrect Marks Correct Mark



Team Name

This sheet is for demonstration and practice only. You must use a real scan sheet for actual competition.

Team #			
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Code

Code	
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

Last Name										First Name									
A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z

Written Exam A / Milk Production					
1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
8	A	B	C	D	E
9	A	B	C	D	E
10	A	B	C	D	E
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E
14	A	B	C	D	E
15	A	B	C	D	E
16	A	B	C	D	E
17	A	B	C	D	E
18	A	B	C	D	E
19	A	B	C	D	E
20	A	B	C	D	E
21	A	B	C	D	E
22	A	B	C	D	E
23	A	B	C	D	E
24	A	B	C	D	E
25	A	B	C	D	E
26	A	B	C	D	E
27	A	B	C	D	E
28	A	B	C	D	E
29	A	B	C	D	E
30	A	B	C	D	E

Written Exam B / Milk Marketing					
31	A	B	C	D	E
32	A	B	C	D	E
33	A	B	C	D	E
34	A	B	C	D	E
35	A	B	C	D	E
36	A	B	C	D	E
37	A	B	C	D	E
38	A	B	C	D	E
39	A	B	C	D	E
40	A	B	C	D	E
41	A	B	C	D	E
42	A	B	C	D	E
43	A	B	C	D	E
44	A	B	C	D	E
45	A	B	C	D	E
46	A	B	C	D	E
47	A	B	C	D	E
48	A	B	C	D	E
49	A	B	C	D	E
50	A	B	C	D	E
51	A	B	C	D	E
52	A	B	C	D	E
53	A	B	C	D	E
54	A	B	C	D	E
55	A	B	C	D	E
56	A	B	C	D	E
57	A	B	C	D	E
58	A	B	C	D	E
59	A	B	C	D	E
60	A	B	C	D	E

Problem Solving

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
8	A	B	C	D	E
9	A	B	C	D	E
10	A	B	C	D	E
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E
14	A	B	C	D	E
15	A	B	C	D	E
16	A	B	C	D	E
17	A	B	C	D	E
18	A	B	C	D	E
19	A	B	C	D	E
20	A	B	C	D	E

Dairy / Non-Dairy Identification and Fat Content

		Sample Number									
I. Identification		1	2	3	4	5	6	7	8	9	10
1	Butter										
2	Flavored Milk										
3	Half and Half										
4	Heavy Cream										
5	Light Whipped Cream										
6	Milk										
7	Sour Cream										
8	Margarine										
9	Non Dairy Creamer										
10	Non Dairy Flavored Beverage										
11	Non Dairy Milk										
12	Non Dairy Sour Cream										
13	Non Dairy Whipped Topping										
II. Fat Content		1	2	3	4	5	6	7	8	9	10
1	0.05% - 0.5%										
2	1% - 2%										
3	3.25% - 3.5%										
4	10.5%										
5	18%										
6	30%										
7	36%										
8	80%										
9	Non Dairy Variable Fat										

Mark one answer in each column

Mark one answer in each column

Appendix A: AFNR Career Cluster Content Standards-Milk Quality

	Performance Measurement Levels	Event Activity Addressing Measurement	Related Academic Standards
AS.06.02. Performance Indicator: Implement procedures to ensure that animal products are safe.			Science: F1 and F5
	AS.06.02.01.b. Discuss consumer concerns with animal production practices relative to human health.	written exam	
BS.02.03. Performance Indicator: Demonstrate proper laboratory procedures using biological materials.			Science: A2, A3 and E1
	BS.02.03.02.a. Perform procedures with biological materials according to directions.	CMT, team activity	
FPP.01.01. Performance Indicator: Evaluate the significance and implications of changes and trends in the food products and processing industry.			Science: F1 Language Arts: 7 and 8 Social Studies: 1g and 8c
	FPP.01.01.01.b. Evaluate changes and trends in the food products and processing industry.	written exam	
	FPP.01.01.02.b. Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, irradiation).	written exam, team activity	
FPP.01.02. Performance Indicator: Work effectively with industry organizations, groups and regulatory agencies affecting the food products and processing industry.			Language Arts: 12 Social Studies: 6c and 8f
	FPP.01.02.02.b. Discuss the application of industry standards in the food products and processing industry.	cheese ID, team activity	
FPP.02.03. Performance Indicator: Apply safety and sanitation procedures in the handling, processing and storing of food products.			Science: A2 and F5
	FPP.02.03.01.b. Evaluate food product handling procedures.	problem solving	
	FPP.02.03.02.c. Interpret quality-assurance test results and apply corrective procedures.	team activity	
FPP.04.02. Performance Indicator: Evaluate, grade and classify processed food products.			Science: F1 Language Arts: 8
	FPP.04.02.01.c. Evaluate, grade and classify processed meat, egg, poultry, fish and dairy products.	milk flavors, cheese ID	

CS.01.01. Performance Indicator: Action: Exhibit the skills and competencies needed to achieve a desired result.			Social Studies: 4d and 4h
	CS.01.01.01.c. Work independently and in group settings to accomplish a task.	team activity	
	CS.01.01.03.a. Exhibit good planning skills for a specific task or situation.	team activity	
	CS.01.01.06.b. Assign project parts equitably amongst team members to achieve a given task.	team activity	
CS.01.02. Performance Indicator: Relationships: Build a constituency through listening, coaching, understanding and appreciating others.			Language Arts: 12 Social Studies: 4h
	CS.01.02.02.b. Utilize communication skills to collaborate in a group setting.	team activity	
CS.01.04. Performance Indicator: Character: Conduct professional and personal activities based on virtue.			Social Studies: 4c and 4f
	CS.01.04.04.c. Demonstrate respect for others.	team activity	
CS.01.05. Performance Indicator: Awareness: Desire purposeful understanding related to professional and personal activities.			Language Arts: 1 Social Studies: 1e, 4e, 10b and 10j
	CS.01.05.01.c. Articulate current issues that are important to the local, state, national and global communities.	team activity	
CS.02.02. Performance Indicator: Social Growth: Interact with others in a manner that respects the differences of a diverse and changing society.			Language Arts: 12 Social Studies: 1e
	CS.02.02.02.c. Present oneself appropriately in various settings.	team activity	
	CS.02.02.03.b. Exhibit the behaviors needed for developing and maintaining a professional relationship.	team activity	
CS.02.04. Performance Indicator: Mental Growth: Demonstrate the effective application of reasoning, thinking and coping skills.			Math: 6C Science: A4 Language Arts: 4 and 8
	CS.02.04.01.c. Demonstrate critical and creative thinking skills while completing a task.	team activity	
CS.02.05. Performance Indicator: Emotional Growth: Demonstrate healthy responses to one's feelings.			Social Studies: 4a
	CS.02.05.03.c. Exhibit self- confidence while in the workplace.	team activity	

CS.03.01. Performance Indicator: Communication: Demonstrate oral, written and verbal skills.			Language Arts: 4, 5 and 12
	CS.03.01.03.c. Make effective business presentations.	team activity	
CS.03.02. Performance Indicator: Decision Making: Analyze situations and execute and appropriate course of action.			Science: A1 and A5 Social Studies: 1c and 4h
	CS.03.02.01.c. Make decisions for a given situation by applying the decision-making process.	team activity	
	CS.03.02.02.c. Use problem-solving skills.	team activity	
CS.03.03. Performance Indicator: Flexibility/Adaptability: Describe traits that enable one to be capable and willing to accept change.			Science: A2, A6 and E2 Language Arts: 7 Social Studies: 8a
	CS.03.03.02.c. Evaluate strategies that can be used to manage change within the workplace.	team activity	

Appendix B: Related Academic Standards-**Milk Quality**

National academic standards for mathematics, science, English language arts and social studies related to this event are reported below. The statements are based on information in reports of the respective associations/organizations in the academic areas. Some adjustment of numbering was done to facilitate the process of alignment with the standards that have been developed in the pathways of the Agriculture, Food and Natural Resources (AFNR) Career Cluster.

The approach was to determine the presence of alignment between the content standards, expectations or thematic strands of the four academic areas and the performance indicators of the AFNR Standards. Supporting statements have been included to clarify content of the respective content standards, expectations or thematic strands. The statements were initially developed independently by the respective organizations and, therefore, are not parallel in wording and presentation. Occasionally minor editing was done to adjust the background or stem of a statement but not the statement itself.

Mathematics

6. Standard and Expectations: Problem Solving

6C. Apply and adapt a variety of appropriate strategies to solve problems.

Science

A. Content Standard: Science as an Inquiry

A1. Identify questions and concepts that guide scientific investigation.

A2. Design and conduct scientific investigations.

A3. Use technology and mathematics to improve investigations and communications. A4.

Formulate and revise scientific explanations and models using logic and evidence. A5.

Recognize and analyze alternative explanations and models.

A6. Communicate and defend a scientific argument.

E. Content Standard: Science and Technology

E1. Abilities of technological design.

E2. Understanding about science and technology.

F. Content Standard: Science in Personal and Social Perspectives

F1. Personal and community health.

F5. Natural and human-induced hazards.

English Language Arts

1. Students read a wide range of print and non-print texts to build an understanding of texts, of themselves and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.
4. Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.
5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.
7. Students conduct research on issues and interests by generating ideas and questions and by posing problems. They gather, evaluate and synthesize data from a variety of sources (e.g., print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.
8. Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.
12. Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information).

Social Studies

1. Thematic Strand: Culture

- 1c. apply an understanding of culture and an integrated whole that explains the functions and interactions of language, literature, the arts, traditions, beliefs and values and behavior patterns;
- 1e. demonstrate the value of cultural diversity, as well as cohesion, within and across groups;
- 1g. construct reasoned judgments about specific cultural responses to persistent human issues;

4. Thematic Strand: Individual Development and Identity

- 4a. articulate personal connections to time, place and social/cultural systems;
- 4h. work independently and cooperatively within groups and institutions to accomplish goals;
- 4c. describe the ways family, religion, gender, ethnicity, nationality, socioeconomic status and other group and cultural influences contribute to the development of a sense of self;
- 4d. apply concepts, methods and theories about the study of human growth and development, such as physical endowment, learning, motivation, behavior, perception and personality;
- 4e. examine the interactions of ethnic, national or cultural influences in specific situations or events;
- 4f. analyze the role of perceptions, attitudes, values and beliefs in the development of personal identity;

6. Thematic Strand: Power, Authority and Governance

- 6c. analyze and explain ideas and mechanisms to meet needs and wants of citizens, regulate territory, manage conflict, establish order and security and balance competing conceptions of a just society;
- 8f. formulate strategies and develop policies for influencing public discussions associated with technology-society issues, such as the greenhouse effect.
- 8c. analyze how science and technology influence the core values, beliefs and attitudes of society, and how the core values, beliefs and attitudes of society shape scientific and technological change;

8. Thematic Strand: Science, Technology and Society

- 8a. identify and describe both current and historical examples of the interaction and interdependence of science, technology and society in a variety of cultural settings;

10. Thematic Strand: Civic Ideals and Practices

- 10b. identify, analyze, interpret and evaluate sources and examples of citizens' rights and responsibilities;
- 10j. participate in activities to strengthen the "common good," based upon careful evaluation of possible options for citizen action.