

DAIRY FOODS

Purpose

This CDE is designed to assist students in gaining knowledge and understanding of important aspects of quality and marketing of milk and cheese.

Objectives

Student should develop the following skills and abilities:

- I. Identify and estimate the intensity of 11 off-flavors that may occur in raw milk and associate the defects with cause and prevention.
- II. Identify each of 17 varieties of cheese.
- III. Identify defects in design and conditions of milking machines and relate these defects to milk quality, udder health, and milking efficiency.
- IV. Estimate intensities of California mastitis test reactions and relate them to abnormal milk control.
- V. Identify selected dairy products based on milk fat content.
- VI. Solve problems related to economics of milk production and marketing.
- VII. Answer questions about milk composition, quality and marketing, including Federal Milk Marketing programs.

Crosswalk with Show-Me Standards

Objectives – Students participating in the Career Development Event should be able to:		Show-Me Standards	
		Knowledge Standards (Content Areas)	Performance Standards (Goals)
1.	Identify and estimate the intensity of 11 off-flavors that may occur in raw milk and associate the defects with cause and prevention.	MA.1 SC.3	1.3, 1.8 3.1, 3.5, 3.6, 3.8
2.	Identify each of 17 varieties of cheese.	HP.3	4.4, 4.7, 4.8
3.	Identify defects in design and conditions of milking machines and relate these defects to milk quality, udder health, and milking efficiency.		
4.	Estimate intensities of California mastitis test reactions and relate them to abnormal milk control.		
5.	Identify selected dairy products based on their milk fat content.		
6.	Solve problems related to economics of milk production and marketing.		
7.	Answer questions about milk composition, quality and marketing, including Federal Milk Marketing programs.		

Corresponding Secondary Agriculture Curriculum			
Course and/or Curriculum:	Agricultural Science I Food Science and Technology	Unit(s):	Introduction to Animal Products Unit II – Food Processing Lesson 3 – Milk Processing Lesson 4 – Processing Dairy Products

Event Format

The Dairy Foods CDE shall consist of the following seven (7) components:

1. Milk Flavor - Ten (10) milk samples will be scored on flavor (taste and odor). Samples will be prepared from pasteurized milk and will score 1-10. Contestants 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, check "No Defect." Defects are worth two points each. Form 3a is provided for practice and scoring.
2. California Mastitis Test (CMT) – **Four (4) milk samples will be provided.** See scoring guide and references. Form 3b is provided for practice and scoring.
3. Milker Units - Five (5) sets of milker unit parts will be scored based on defects present. The flexible plastic parts are to be scored as rubber parts, and rigid plastic or glass parts are to be scored as metal parts. Contestants will be permitted to bring and use flashlights. Form 4a is provided for practice and scoring.
4. **Cheese Identification – Ten (10) cheese samples for identification will be selected from those listed on the answer sheet, Form 4b. Cubes of cheese will be available for tasting.**
5. **Problem Solving A. Milk Fat Content Identification - Students will identify five (5) dairy products distinguished by their milk fat content. Products will come from the list on Form 5A. Duplicate samples may be used. NOTE: On Dairy Foods Scansheet (Form#: 479-3), use the back-side of the Scansheet, Part II Test, questions 1-5 to enter answers for this activity. If using the Scansheet, a list of the products, as labeled A. – E. above should be provided on the table next to the samples.**
6. Problem Solving B. Federal Order Milk Marketing Problem
During an eighteen minute period, ten (10) written problems will be answered testing knowledge of Federal Order provisions for pricing milk as well as determination of hauling charges and pricing incentives related to quality and composition. Milk marketing problem formulas will be provided. **NOTE: On Dairy Foods Scansheet (Form#: 479-3), use the back-side of the Scansheet, Part II Test, questions 11-20 to enter answers for this activity.**
7. Written Test - Participants will answer fifty (50) multiple choice questions. Twenty-five (25) questions will refer to milk composition and quality. Twenty-five (25) questions will refer to milk marketing.
8. Contestants will be allowed three hours for the event with five segments being allotted 36 minutes each.
9. **The Dairy Foods CDE will utilize a positive scoring system to rank contestants and teams.**

Event Scoring

1. MILK FLAVOR

A. Two factors are scored for each milk sample. The first score is generated by correctly identifying the flavor defect in the milk sample. The second score is generated by scoring the intensity of the flavor defect within the sample.

B. Two (2) points will be awarded for correct identification of the flavor defect. Possible flavor defects are listed in the Milk Flavor Scoring Chart below.

C. Ten (10) points will be awarded for correctly scoring the intensity of the flavor defect. For each position away from the correct "score", 1 point is deducted. See the Milk Flavor Scoring Chart below and footnotes as a reference on scoring intensity of flavor defects.

D. A milk sample scored as No Defect should be scored with an intensity score of 10.

Example:

- Official Scoring on Milk Sample #1 is Malty / 5.
- Contestant marks their card as Malty / 3.
- 2 points are awarded for correctly identifying the flavor defect. 8 points are awarded for the intensity ranking as the student was 2 positions away from the correct intensity score (1 point * 2 positions = 2 point deduction). The contestant receives 10 out of 12 possible points for this Milk Sample #1.

Milk Flavor Scoring Chart			
	SCORES ^a		
OFF FLAVOR	Slight	Definite	Pronounced
Acid	3	1	– ^b
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		
Oxidized/Metallic	6	4	1
Rancid	4	1	–
Salty	8	6	4

^aSuggested scores are given for three intensities of flavors: S--slight, D--definite, P--pronounced. Scores may range from 1 to 10. On a quality basis: 10 = excellent, 8 to 9 = good, 5 to 7 = fair, 2 to 4 = poor, and 1 = unacceptable. Intermediate numbers may also be used; for example, a bitter sample of milk may score 4.

^bWhere a dash is entered, a product with an intensity of "off flavor" will not be used in the event.

2. CALIFORNIA MASTITIS TEST

- A. Contestants will mark the CMT score on their scorecard based on the CMT Guide Chart below and references.
- B. The contestants shall be awarded points by subtracting their Contestant Score from the Official Score. This would represent the points missed or incorrect. This sum should then be subtracted from the 64 total points possible. See “CMT Scoring Example” below.

CMT Guide Chart		
<u>CMT Score</u>	<u>Test Appearance</u>	<u>Contestant Score</u>
Negative	Mixture liquid, no precipitate	0
T	Slight precipitate, tends to disappear with paddle movement	2
1	Distinct precipitate but does not gel	4
2	Distinct gel formation	6
3	Strong gel formation which tends to adhere to paddle. Forms distinct central peak.	8
Use only number 0, 2, 4, 6, and 8.		

CMT Scoring Example						
Perfect Score	Defects	Sample Number				Total Grades
		1	2	3	4	
California Mastitis Test (CMT) 8 pts.	Contestant's Score	8	4	2	6	XXXXXXXX
	Official Score	6	4	2	8	32
	Grade Difference	2	0	0	2	-4
		TOTAL				28

3. MILKER UNIT PART CUTS

- A. Five (5) milker unit parts will be evaluated. Eight (8) points will be possible for each sample.
- B. Contestants will evaluate the milker unit parts for defects. Each milker unit part will receive a deduction based off the Milker Part Defect Deduction Chart below. Contestants will mark their score card in two ways.
 - 1. Identifying which defects are present in the milker unit part. Each defect is worth 0.5 points.
 - 2. Providing a contestant's score for the milker unit part based on the deductions for defects. Each deduction is worth 0.5 points.

Example: Milker Unit Part # 1 is only a Rubber Part and is **officially scored** as:

- A. *Checked or Blistered, Poorly fitted, and Dirty or Milkstone.*
- B. The Official Score for Milker Unit Part #1 is then: $4 - (3 \text{ defects} \times 0.5) = 2.5$

The **contestant** marked Milker Unit Part #1 as:

- A. *Checked or Blistered and Leaky.*
- B. They gave the Milker Unit Part #1 a score of **3.0**

The contestant would be awarded **2.5** points for the identification of defects (they lost points for not marking *Poorly Fitted* and *Dirty or Milkstone* **AND** lost points for marking *Leaky*) and **3.5** points tabulating the deductions with a final score for Milker Unit Part #1 of **6** points.

Milker Part Defect Deduction Chart	
Milker Part Defect	Deduction
Rubber parts--dirty or milkstone	0.5
Rubber parts--checked or blistered	0.5
Rubber parts--leaky	0.5
Rubber parts--poorly fitted	0.5
Metal parts--dirty or milkstone	0.5
Metal parts--badly dented or damaged	0.5
Metal parts--pitted or corroded	0.5
Metal parts--open seams	0.5

Note: Calculate score per sample as: $4 - (\text{number of defects} \times .5) = \text{contestant score}$.

A combination of undesirable factors may score the milker unit zero.

4. CHEESE IDENTIFICATION

A. Ten (10) Cheese Samples will be identified valued at 2 points each.

5. PROBLEM SOLVING A. Milk Fat Content Identification

A. Five (5) samples will be identified based on their milk fat content from the list on Form 5A valued at 4 points each. Duplicate samples may be used.

NOTE: On Dairy Foods Scansheet (Form#: 479-3), use the back-side of the Scansheet, Part II Test, questions 1-5 to enter answers for this activity.

6. PROBLEM SOLVING B. Federal Order Milk Marketing Problem

A. Ten (10) questions over milk marketing will be posed valued at 2 points each.

NOTE: On Dairy Foods Scansheet (Form#: 479-3), use the back-side of the Scansheet, Part II Test, questions 11-20 to enter answers for this activity.

7. WRITTEN TEST

A. Fifty (50) questions valued at one (1) point each.

STATE Event Scoring

Events	Points Possible
1. Milk Flavor – Ten (10) milk samples at 12 points each	120 points
2. CMT - Four (4) milk samples using CMT method at 8 points each	32 points
3. Milker Units – Five (5) milker unit parts at 8 points each	40 points
4. Cheese Identification – Ten (10) cheese samples at 2 points each	20 points
5. Problem Solving – Part 1. Milk Fat Identification – Five (5) samples as at 4 points each Part 2. Milk Marketing – Ten (10) questions at 2 points each	20 points 20 points
6. Written Test – 50 questions at 1 point each	50 points
Total Points	302 points

1. The team score shall be the sum of the different scores of the top three individual team members. The state Dairy Foods CDE will utilize a “high point” scoring system. The team with the highest team score will be classified the winner.
2. Grade differences are determined on each form by difference between the Official Score and the Contestant's Score.

Event Rules and Regulations

1. Contestants will report for instructions to the Superintendent at the time and place shown in the Schedule of Events.
2. Contestants will be allowed three hours for the event with five segments being allotted 36 minutes each.
3. Calculators may be used. In all events, only six-function, (nonprogrammable and non-graphing) models may be used. Therefore, the calculators are limited to the following keys: Plus (+); Minus (-); Multiplication (x); Division (/); Equals (=); Memory Clear/Recall (MRC) Memory Minus (M-); Memory Plus(M+); Plus / Minus (+/-); Percentage (%); Square Root ($\sqrt{\quad}$). See page 3, rule #8 of the General CDE Guidelines for an example.

References

10-4170-A Dairy Foods: Producing the Best (IML 2005) PDF on CD-ROM. Industrial Materials Lab
<http://www.iml.missouri.edu>

Milk Facts (updated annually) available from Milk Industry Foundation, 1250 H St., NW, Suite 900, Washington, D.C. 20005; Phone: 202-737-4332; Use previous year's issue.

Science and Technology Guide, Using the California Mastitis Test, Cooperative Extension Service, University of Missouri, Columbia, MO 65211.

Farmers Bulletin 2259, Judging and Scoring Milk and Cheese, Dairy Division, AMS, United States Department of Agriculture, Washington, DC 20250, Phone: (202) 447-7473. Available at:
<http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELDEV3004794>

California Mastitis Test can be ordered from NASCO, catalog number C6059N. Toll free 1-800-558-9595 (Wisconsin, 1-800-242-9587). NASCO, 901 Janesville Ave, Ft. Atkinson, WI 53538.

USDA Government web sites:

Federal Milk Marketing Orders <http://www.ams.usda.gov/dairy/index> (click *Federal Milk Marketing Orders*, additional useful references on cheese is available by clicking *How to Buy Dairy Products* then *Cheese*).

Judging and Scoring Milk and Cheese is viewable at
<http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELDEV3004794>

Dairy Product-related Publications <http://www.ams.usda.gov/dairy/dypubs.htm>

Forms

See following pages for Form 3a, Form 3b, Form 4a, Form 4b, and Form 5a.

**DAIRY FOODS CDE
Milk Flavor**

Name: _____ Contestant No: _____

School: _____ School No: _____

Write scores only on the line marked for contestant's score. Mark (X) in space opposite the defect noted and in proper sample column. DO NOT WRITE in space indicating official score, grade difference, grade on defects, rubber parts, and metal parts.

Perfect Score	Defects	Sample Number										Total Grades	
		1	2	3	4	5	6	7	8	9	10		
Milk Flavor No Defect 10 points	Contestant's Score												
	Official Score												
	Grade Difference												
	Grade on Defects												
	Bitter												
	Feed												
	Flat-watery												
	Foreign												
	Garlic or Onion												
	High Acid												
	Malty												
	Metallic/Oxidized												
	Rancid												
	Salty												
No Defect													
		TOTAL											

**DAIRY FOODS CDE
CMT**

Name: _____ Contestant No: _____

School: _____ School No: _____

Write scores only on the line marked for contestant's score. Mark (X) in space opposite the defect noted and in proper sample column. DO NOT WRITE in space indicating official score, grade difference, grade on defects, rubber parts, and metal parts.

Perfect Score	Defects	Sample Number				Total Grades
		1	2	3	4	
California Mastitis Test (CMT) 8 pts.	Contestant's Score					XXXXXXXX
	Official Score					32
	Grade Difference					
		TOTAL				

**DAIRY FOODS CDE
Milker Units**

Name: _____ Contestant No: _____

School: _____ School No: _____

Perfect Score	Defects	Sample Number					Total Grades
		1	2	3	4	5	
Milker Unit No Defect 4 points (defects valued at 0.5 points each)	Contestant's Score						
	Official Score						
	Grade Difference						
	Grade on Defects						
	Rubber Parts						
	dirty or milkstone						
	checked or blistered						
	leaky						
	poorly fitted						
	Metal Parts						
	dirty or milkstone						
	badly dented/damaged						
	pitted or corroded						
	open seams						
	TOTAL						

**DAIRY FOODS CDE
Cheese Identification**

Name: _____ Contestant No: _____

School: _____ School No: _____

	Varieties	Sample Number										Total Grades
		1	2	3	4	5	6	7	8	9	10	
Identification of Cheese (Incorrect Identification 2 points ea.)	Grade on Identification*											
	1. Blue											
	2. Brick											
	3. Brie/Camembert											
	4. Cheddar (mild)											
	5. Cheddar (sharp)											
	6. Colby											
	7. Cream/Neufchatel											
	8. Edam/Gouda											
	9. Monterey (Jack)											
	10. Mozzarella/Pizza											
	11. Muenster											
	12. Processed American											
	13. Provolone											
	14. Swiss											
	15. Feta Cheese											
	16. Romano											
17. Havarti												
	TOTAL											

**DAIRY FOODS CDE
MILK FAT CONTENT IDENTIFICATION**

Name: _____ Contestant No: _____

School: _____ School No: _____

Five samples will be provided numbered 1-5. Contestants will indicate which numbered sample matches dairy food product by placing an "X" in the correct box. Only five samples will be provided, but duplicates may be used.

Milk Fat Content					
	Sample				
	1	2	3	4	5
A. Non-fat					
B. Lowfat					
C. Milk					
D. Half/Half					
E. Whipping Cream					

NOTE: On Dairy Foods Scansheet (Form#: 479-3), use the back-side of the Scansheet, Part II Test, questions 1-5 to enter answers for this activity. If using the Scansheet, a list of the products, as labeled A. – E. above should be provided on the table next to the samples.