Milk Quality and Products

Maximum Number of Team Members	4	
Number of Team Members Scored	4	
Scantron	Dairy Foods – Form Number – 479-6	
Committee: Leon Ammons Mary Phillips Ben Hays Steve Tennant John Workman		

Purpose of the Contest:

- To enhance learning activities relative to the production, processing, distribution and consumption of dairy products.
- To assist students to develop a sound perspective for utilizing the decision-making process.

Objectives:

I. Develop abilities to utilize knowledge of high-quality milk, its production and marketing

- A. Milk Production
    1. Regulations
    2. Grades and classes of milk
- B. Cleaning and Sanitizing
    1. General types of cleaners and sanitizers
    2. Water hardness
    3. Milkstone
    4. Equipment, teats and udders
- C. Cooling Milk
- D. Abnormal Milk
    1. Causes
    2. Prevention
    3. Detection (California & Wisconsin Mastitis Tests and Confirmatory tests)
    4. Regulatory programs
- E. Milk Marketing, Economics and Distribution
    1. Transportation
    2. Cooperatives
    3. Pricing
    4. Supply and Demand

F. Diseases Transmitted to Man Via Milk
G. Off Flavors of Milk

II. Develop abilities to utilize knowledge of the composition and quality characteristics of milk.

A. Nonfat Solid Portion
B. Milkfat
C. Adulterants, Including Water
D. Bacteria and General Methods of Estimating Their Numbers; Maximum Numbers
E. Somatic Cells; Maximum Numbers

III. Develop an understanding that clean cows and a clean environment are necessary to produce clean milk and how industry and government use the sediment test to detect unclean conditions.

IV. Be able to utilize selected skills to identify cheese varieties.

V. Be able to utilize selected skills in evaluating the quality of milk.

CONTEST FORMAT

Contest will include: (Ties will be broken on milk flavor scores)

10 Milk Samples	20 minutes	120 points
10 Product Identification-Dairy Versus Non-Dairy	20 minutes	100 points
California Mastitis Test	20 minutes	40 points
10 Cheese Type ID	20 minutes for both cheese activities	40 points
10 Cheese Characteristics ID		60 points
Problem Solving	40 minutes	100 points
Written Test	40 minutes	120 points

Suggested Layout for Contest

Contestants 1	Contestants 2	Contestants 3	Contestants 4
Milk Samples & Product Identification - Dairy vs Non-Dairy	Cheese ID & Cheese Characteristics ID	Problem Solving	Written Test

RULES OF THE CONTEST

1. Contestants will report for instructions to the Division Superintendent at the time and place shown in the current year's Contests Schedule.
2. Paper cups for sampling purposes will be provided for the contestants.
3. Sample score cards are included on the following pages.

4. Cheese samples for identification will be selected from those listed on the score sheet Form 3. Cubes of the cheeses will be available for tasting. See references for cheese identification listed below.
5. Milk samples will be scored using Form 3. All samples of milk are prepared from pasteurized milk intended for table use and will score 1 to 10. **Milk samples will be tempered to 60 F.**
6. Contestants are to use whole numbers when scoring "Flavor" of milk. Check only the one most serious defect in **each milk** sample even if more than one flavor is detected. If no defect is noted, check "No defect."
7. Apples will be allowed for taste bud refreshing.
8. The score made by each contestant is the number of points deducted; therefore, the lower score, the higher rating.
9. Students may bring their own bottled water and an apple
10. Recommended references to use for preparation of the contest:

    A. 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.

    B. 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)

    C. 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.

    D. Dairy Handbook, TETRA Pak Processing Systems 8101 Corporate Woods Parkway Vernon Hills, IL 60061.

    E. *Dairy Foods: Producing the Best,* Dr. Robert Marshall; Instructional Materials Laboratory, 1400 Rock Quarry Road, Q139, University of Missouri; Columbia, MO 65211

    F. 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.

    G. *Dairy Facts – International Dairy Foods Association, 1250 H Street, N.W. Suite 900, Washington DC 20005 Phone – 202-732- 4332– www.idfa.org Agricultural Marketing Service www.ams. USDA.gov*

    H. *Judging and Scoring Milk and Cheese, Farmers bulletin # 2259, United States Department of Agriculture, Washington DC, 20250 – Phone 202-447-7473*

    I. *Judging, Identifying and Scoring Dairy Products – Bulletin J250c, University of Illinois, 1401 S. Maryland Drive, Urbana, IL 61801 Phone – 217-333-3871*

A. Milk Flavor Identification and Evaluation (20 minutes) - 120 points
1. Ten milk samples will be scored on flavor (taste and odor) using the computerized scorecard. All samples of milk are prepared from pasteurized milk intended for table use and will score 1 to 10 (See Scoring Guide). Milk samples will be tempered to 60°F. Only those cups provided at the event may be used.
2. Participants are to use whole numbers when scoring "Flavor" of milk and to check only the most serious defect in a sample even if more than one flavor is detected. If no defect is noted, participants should check, "No defect" and score as a ten (See Scoring Guide).
3. Palette cleansers (e.g. apples or soda crackers) will be allowed for refreshing.

Scoring Guide – Refer to the current scorecard being used at the national level.
Scores may range from 1 to 10. On a quality basis:
- 10 excellent (no defect)
- 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 three intensities of flavor. All numbers within the range may be used. Intermediate numbers may also be used; for example, a bitter sample of milk may score 4.

B. PRODUCT IDENTIFICATION-DAIRY VERSUS NON-DAIRY (100 POINTS, 6 POINTS IDENTIFICATION, 4 POINTS FAT CONTENT)

- A total of ten samples consisting of dairy and non-dairy products will be identified and assigned a milk fat content score.
- The following products may be included among the samples:
  - Dairy Products: nonfat (skim) milk (.05%), reduced fat milk (2%), milk (3.25%), half and half (10.5%), butter (80%), sour cream (18%), flavored milk (3.3%) light whipped cream (30%), heavy cream (35%)

      o 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.

C. California Mastitis Test (40 points)

1. The California Mastitis Test will be scored using even numbers from 0 to 8 inclusive. (See below for the Scoring Guide for the California Mastitis Test.)
2. Five samples of milk will be evaluated for abnormality, using the California Mastitis Test method.

CALIFORNIA MASTITIS TEST (40 POINTS)

- The California Mastitis Test will be scored using even numbers from 0 to 8 inclusive. (See below for the Scoring Guide for the California Mastitis Test.)

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

Scoring Guide

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	1,2000,000 – 1,500,000
3	Strong gel formation, which tends to adhere to paddle. Forms distinct central peak	8	Over 5,000,000

D. Cheese Identification (20 Minutes) - 100 points
1.   Ten cheese samples for identification will be selected from those listed below. Cubes of the cheeses will be available for tasting. Note: More than one sample of

a given cheese may be used. A score of 4 points is given for each variety correctly identified. Uncolored cheeses may be used.

2. In addition to identifying cheese samples, participants will classify characteristics of identified cheeses using the following matrix. Participants will have seven characteristics to select based on the ten identified cheese samples (60 points possible). An example cheese characteristic problem can be found in the reference section of this handbook

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	Grease
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
Munster	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 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				

E. Problem Solving (40 Minutes) - 100 Points

The problem solving test will consist of critical-thinking, multiple choice questions. Topics may include, but are not limited to:
1. Decisions about the quality and acceptability of milk.
2. Calculations of the value of milk and components of milk.
3. Decisions about components of milk and milk products (including processing procedures).
4. Decisions about the use of chemicals in cleaning and sanitizing operations.

Starting in 2014, Problem Solving will come from the past five years of the National Dairy Foods CDE Tests. Each year an additional national Problem Solving will be added to the pool

until ten years of Problem Solving have been reached. Once ten years of Problem Solving have been added to the pool, each year the latest Problem Solving will be added and the oldest Problem Solving removed from the question pool.

F. WRITTEN TEST (120 points)

The written test will be comprised of a total of 60 multiple - choice items (2 points each). The test will be given in two parts with one part consisting of questions on quality milk production and a second part on milk marketing.

Starting in 2012, test questions will come from the past five years of the National Dairy Foods CDE Tests. Each year an additional national test will be added to the question pool until ten years of questions have been reached. Once ten years of questions have been added to the pool, each year the latest test will be added and the oldest test removed from the question pool.

TIEBREAKERS

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

1. Milk identification
2. Cheese identification
3. Product identification
4. Problem solving

Milk Quality and Products Form #479-6

Incorrect Marks ✓ ✗ ━ ⊙ **Correct Mark** ⬤

Team #

Last Name / **First Name** — bubble grid A–Z

Code

Written Exam A / Milk Production — Questions 1–30, options A B C D E

Written Exam B / Milk Marketing — Questions 31–60, options A B C D E

Problem Solving

1–20, options 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

Identification and Characteristics of Cheeses

I. Identification

Sample Number	1	2	3	4	5	6	7	8	9	10
1 Blue/Bleu	○	○	○	○	○	○	○	○	○	○
2 Brie	○	○	○	○	○	○	○	○	○	○
3 Cheddar Mild	○	○	○	○	○	○	○	○	○	○
4 Cheddar Sharp	○	○	○	○	○	○	○	○	○	○
5 Cream/Neufchatel	○	○	○	○	○	○	○	○	○	○
6 Edam/Gouda	○	○	○	○	○	○	○	○	○	○
7 Monterey Jack	○	○	○	○	○	○	○	○	○	○
8 Mozzarella	○	○	○	○	○	○	○	○	○	○
9 Processed American	○	○	○	○	○	○	○	○	○	○
10 Provolone	○	○	○	○	○	○	○	○	○	○
11 Swiss	○	○	○	○	○	○	○	○	○	○
12 Colby	○	○	○	○	○	○	○	○	○	○
13 Feta	○	○	○	○	○	○	○	○	○	○
14 Havarti	○	○	○	○	○	○	○	○	○	○
15 Gruyere	○	○	○	○	○	○	○	○	○	○
16 Muenster	○	○	○	○	○	○	○	○	○	○
17 Parmesan	○	○	○	○	○	○	○	○	○	○
18 Queso Fresco	○	○	○	○	○	○	○	○	○	○
19 Ricotta	○	○	○	○	○	○	○	○	○	○
20 Romano	○	○	○	○	○	○	○	○	○	○

Mark one answer in each column!

II. Characteristics

	1	2	3	4	5	6	7	8	9	10
A	○	○	○	○	○	○	○	○	○	○
B	○	○	○	○	○	○	○	○	○	○
C	○	○	○	○	○	○	○	○	○	○
D	○	○	○	○	○	○	○	○	○	○
E	○	○	○	○	○	○	○	○	○	○
F	○	○	○	○	○	○	○	○	○	○

Mark all that apply!

CMT

Score	1	2	3	4	5
0	○	○	○	○	○
2	○	○	○	○	○
4	○	○	○	○	○
6	○	○	○	○	○
8	○	○	○	○	○

Mark one answer in each column!

Natural / Imitation

Food Identification	1	2	3	4	5	6	7	8	9	10
1 Natural	○	○	○	○	○	○	○	○	○	○
2 Imitation	○	○	○	○	○	○	○	○	○	○

Mark one answer in each column!

Milk Flavor

I. Defect

Sample Number	1	2	3	4	5	6	7	8	9	10
1 Acid	○	○	○	○	○	○	○	○	○	○
2 Bitter	○	○	○	○	○	○	○	○	○	○
3 Feed	○	○	○	○	○	○	○	○	○	○
4 Flat-watery	○	○	○	○	○	○	○	○	○	○
5 Foreign	○	○	○	○	○	○	○	○	○	○
6 Garlic or onion	○	○	○	○	○	○	○	○	○	○
7 Malty	○	○	○	○	○	○	○	○	○	○
8 No defect	○	○	○	○	○	○	○	○	○	○
9 Oxidized	○	○	○	○	○	○	○	○	○	○
10 Rancid	○	○	○	○	○	○	○	○	○	○
11 Salty	○	○	○	○	○	○	○	○	○	○

Mark one answer in each column!

II. Score

	1	2	3	4	5	6	7	8	9	10
1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
10	○	○	○	○	○	○	○	○	○	○

Mark one answer in each column!