

9 CHAPTER

NATIONAL FFA

DAIRY FOODS

CAREER DEVELOPMENT EVENT

A Special Project of the National FFA Foundation

IMPORTANT NOTE

Please thoroughly read the Introduction Section at the beginning of this handbook for complete rules and procedures that are relevant to all National FFA Career Development Events.

I. PURPOSE

To enhance learning activities related to milk quality, federal milk marketing, attributes of milk products and substitutes for them.

The focus of this Career Development Event is on achievement of high quality raw milk, federal milk marketing orders and attributes of selected products of milk.

There are four general areas or functions in the network of persons who make possible the enjoyment of high quality dairy foods by consumers. These are:

1. Milk production.
2. Milk quality and safety.
3. Milk processing or manufacturing.
4. Marketing of either raw milk or finished products.

The production of high quality raw milk requires the following:

- Clean and healthy cows.
- Equipment that is constructed appropriately from approved materials.
- Proper installation and operation of the equipment.
- Rapid cooling of the milk to not more than 41°F (3°C).
- Delivery of the milk to the processor within 48 hours.
- Prevention of contamination of the milk with added water, antibiotics, pesticides, cleaning and sanitizing chemicals, medicinal agents and any other foreign matter.

Fresh raw milk should possess a sweet bland flavor, be free of flavors from the feeds the cows

eat and be low in numbers of somatic cells and bacteria. Mixed milk from several cows (herd milk) is expected to contain at least 3.5% milk fat, 3.1% protein and 4.8% lactose, the main characterizing constituents. It is the most important source of calcium in the diet of the average American, supplying approximately 75% of the dietary calcium.

Young persons considering a career related to the subject matter in this CDE may wish to consider that persons of the following groups contribute to the successful production of high quality milk and milk products:

Dairy farmers: own, manage and milk the cows and prepare milk for dealers.

Field representatives of the buying and/or selling organizations: provide advice to producers and promote milk quality for buyers.

Milk sanitarians: enforce public health regulations.

Food technologists: apply chemical, physical, microbiological and sensory tests to determine the quality and safety of milk and milk products.

Manufacturers and dealers of dairy equipment: supply equipment and service it.

Suppliers of chemicals used in cleaning and sanitizing: provide chemicals and advice on their proper use.

Veterinarians: treat diseased animals and advise producers on disease prevention.

Officials and technicians of the USDA Federal Milk Marketing Orders: sample, test and account for milk marketed under Federal orders; apply regulations to marketing of raw milk.

U. S. Food and Drug Administration: manages the regulation of grade A milk.

U. S. Department of Agriculture: manages the regulation of manufacturing grade milk; provides grading services to manufacturers of butter, cheese and nonfat dry milk.

State departments of agriculture and/or public health: manage the public health regulations applied to milk at the state level.

State Dairy Extension Agents: provide advice to dairymen regarding production and sale of milk.

II. OBJECTIVES

A. Develop abilities to utilize knowledge of high quality milk production.

1. Quality Milk Production
 - a. Regulations
 - b. Grades and classes of milk
 - c. Factors necessary to produce quality milk
2. Cleaning and Sanitizing
 - a. General types of cleaners and sanitizers
 - b. Water hardness
 - c. Milkstone
 - d. Equipment, teats and udders
3. Cooling Milk
4. Diseases Transmitted to Man via Milk
5. Causes of Off Flavors in Milk

B. Develop abilities to utilize knowledge of milk marketing.

1. Developing Marketing and Marketing Concepts
 - a. Trends
 - b. Economics

- c. Supply and demand
 - d. Nutrition
- 2. Federal Milk Marketing Orders, Economics and Distribution
 - a. Transportation
 - b. Cooperatives
 - c. Pricing
- C. Develop abilities to utilize knowledge of the composition and quality characteristics of raw and pasteurized milk.**
 - 1. Nonfat solids portion
 - 2. Milkfat
 - 3. Adulterants, including water
 - 4. Bacterial standards and usual methods of estimating their numbers
- D. Develop an understanding of the causes and control of mastitis, its influences on milk quality and yield and the use of mastitis detection methods in controlling the disease in production of abnormal milk.**
 - 1. Causes
 - 2. Prevention
 - 3. Detection (California mastitis test and electrical conductivity)
 - 4. Treatment
 - 5. Regulatory programs
- E. Be able to identify cheese varieties.**
- F. Be able to identify and evaluate the flavor quality of milk.**

- G. Be able to identify dairy products and non-dairy products (imitations and substitutes).**
- H. Be able to identify defects of milker unit parts affecting milk quality.**

III. EVENT RULES

- A. Team make-up- Teams may consist of three or four members. Team ranking is determined by combining the scores of the top three students from each team. Teams that, for whatever reason, have fewer than three members are not eligible for team awards, but students may receive individual awards.
- B. It is highly recommended that all participants be in official FFA dress for all events.
- C. Participant will report for instructions to the Event Superintendent at the time and place shown in the current year's team orientation packet.
- D. Participants will be allowed three (3) hours and forty-five (45) minutes for the event.
- E. Participants are not to use strong deodorant, perfume, chewing gum or other detractors to the taste and smell senses.

IV. EVENT FORMAT

- A. Equipment**
 - 1. **Materials provided by the student-** two #2 pencils only
 - 2. *Optional - students may wish to bring a non-programmable calculator, flashlight, bottled water and an apple.*
 - 3. **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.**

B. Flow of Event

- Milk Flavor Identification and Evaluation - 36 minutes
- California Mastitis Test - 18 minutes
- Milker Units - 18 minutes
- Cheese Identification - 18 minutes
- Dairy and non-dairy product identification - 18 minutes
- Written exam - 36 minutes
- Problem Solving - 36 minutes
- Team Activity - 36 minutes

2. 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 check, "No defect" and score as a ten (10) (See Scoring Guide.)
3. Apples or saltwater will be allowed for refreshing. *Only those cups provided* at the event may be used.

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 (<i>no defect</i>)
8 to 9	good
5 to 7	fair
2 to 4	poor
1	unacceptable/ un-salable

V. TEAM ACTIVITY

Team problem solving (36 Minutes) (25 points)

All team members will be responsible for solving from the following:

- Sanitation: for example, concentrations of chemicals in solutions
- Marketing: for example, values and compositions of milk and dairy foods
- Distribution: for example, costs of operations

VI. INDIVIDUAL ACTIVITIES

A. Milk Flavor Identification and Evaluation (36 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.

Example: Milk Flavor

DEFECTS	SCORES ^a		
	<i>Slight</i>	<i>Definite</i>	<i>Pronounced</i>
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

^a 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. California Mastitis Test (18 minutes) (64 points)

1. The California Mastitis Test will be scored using computerized scorecard. Samples should be scored using even numbers from

0 to 8 inclusive. See below “Scoring Guide for the California Mastitis Test.”

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

Scoring Guide

CMT Test Score	Appearance	Participant Score*
Negative	Mixture liquid, no precipitate	0
T	Slight precipitate tend 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

* Participant scores only even numbers for CMT test

C. Milker Unit Parts (18 Minutes) (40 points)

1. Five sets of milker unit parts to be scored on defects using the computerized scorecard. The flexible plastic parts are to be scored as rubber parts and rigid plastic or glass parts are to be scored as metal parts. Participants will be permitted to bring and use flashlights. Students are to utilize a 0.5-point deduction for each defect identified. Units may have multiple defects.
2. In accordance with the dairy foods industry, the score made by each participant is the number of points deducted when compared to the official score; therefore, the lower the score, the higher the rating.

Defects

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

Defects

Metal parts - dirty or milkstone	0.5
Metal parts - dented or damaged	0.5
Metal parts - pitted or corroded	0.5
Metal parts - open seam	0.5

A combination of undesirable factors may score the milker unit zero. Each display of milker parts is scored as a unit, both inside and outside. Display boards are not to be handled. Participants will score each item and indicate the defect in the proper column on the score sheet.

D. Cheese Identification (18 Minutes) (20 points)

1. Ten cheese samples for identification will be selected from those listed below. Cubes of the cheeses will be available for tasting. See references for cheese identification. Note: More than one sample of a given cheese may be used.

2. A score of two points is given for each variety incorrectly identified. Uncolored cheeses may be used.

- Bleu
- Brie/Camembert
- Brick
- Cheddar (mild)
- Cheddar (sharp)
- Colby
- Cream/Neufchatel
- Edam/Gouda
- Feta
- Havarti
- Monterey(Jack)
- Mozzarella/Pizza
- Munster
- Processed American
- Provolone
- Romano
- Swiss

E. Dairy and Non-dairy products (18 minutes) (20 points)

Students will identify dairy and no-dairy (imitation – artificial) products and/or ingredient labels. Samples will come from the following list. (May also include new products as they are developed.)

- Butter
- Coffee Whitener
- Cheese
- Cottage Cheese
- Cream Cheese
- Imitation Cheese
- Frozen Desserts
- Ice Cream
- Half and Half
- Margarine
- Milks

- Sour Cream
- Whipped Cream
- Whipped Non-dairy Topping

F. Problem Solving (36 Minutes) (25 Points)

1. Decisions about the quality and acceptability of milk.
2. Calculations of the value of milk and components of milk.
3. Decisions about nutritional value of milk and milk products.
4. Decisions about the use of chemicals in cleaning and sanitizing operations.

G. Written Test (36 Minutes) (100 points)

The written test will be comprised of a total of fifty (50) multiple - choice items. The test will be given in two parts with one part consisting of twenty-five (25) questions on quality milk production and a second part of twenty-five (25) questions on milk marketing. An increased emphasis will be placed on general marketing and promotion.

VII. TIEBREAKERS

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

1. Milk Production Written Exam
2. Milker Parts
3. Cheese Identification

VIII. SCORING

Dairy Foods is a negatively scored event, lowest score wins. Each incorrect answer has a value of n points. Correct answers carry no value.

Points

- Milk Flavor Identification and Evaluation (ten samples) 120
- California Mastitis Test (eight samples) . . 64
- Milker Units (five sets) 40
- Cheese Identification (ten samples) 20
- Dairy and non-dairy product identification (ten samples). 20
- Written exam (fifty two-point questions). 100
- Problem Solving 25

Team Activity. 25

Total Points per individual (x 3 members) 389

Total Points per team 1,192

IX. AWARDS

Awards will be presented at an awards ceremony. Awards are presented to teams as well as individuals based upon their rankings. Awards are sponsored by a cooperating industry sponsor(s) as a special project, and/or by the general fund of the National FFA Foundation.

X. REFERENCES

This list of references is not intended to be 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.

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.

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).

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.

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

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

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.

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

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

Judging, Identifying and Scoring Dairy Products – Bulletin #250c, University of Illinois, 1401 S. Maryland Drive, Urbana, IL 61801 Phone – 217-333-3871