Dairy Cattle Evaluation & Management

CDE Handbook

DAIRY CATTLE EVALUATION AND MANAGEMENT

1. Purpose

The Dairy Cattle Evaluation and Management CDE helps students develop skills in dairy cattle selection and her management. Participants evaluate the cattle's physical characteristics, explain their various classes, and analyze herd records.

2. Objectives

The Dairy Cattle Evaluation and Management CDE provides the opportunity for the participant to:

a. Gain practical experience to help prepare for dairy cattle industry positions or in management of a modern dairy herd.
b. Develop skills in observation, analysis, communication, and team collaboration
c. Gain experience in the evaluation of dairy cattle type, production records and dairy herd management.

3. Rules

a. Each chapter may enter a team of three to five participants.
b. Team scores will be determined by totaling the three highest individual team members' scores.
c. Participants must meet all eligibility requirements listed in the state convention general rules.
d. All classes will be selected from the breeds of Dairy Cattle available to the NDSU Dairy Barn.
e. Using Universal Form C #705C-1.
f. Participants will be permitted to view the animals from all angles but will not be permitted to handle them. The squad leader will arrange for rear view, side view, front view, and close-up inspection (optional) of all classes.

4. Format

The Dairy Cattle Evaluation and Management CDE will consists of

a. Placing classes
    1. Five or six placing classes of four animals will be placed on type. Classes may range from heifers to mature cows and will be provided by NDSU Dairy Barn.
    2. Twelve (12) minutes will be allowed per class for placing. Fifteen (15) minutes will be allowed for classes that oral reasons will be presented on.
    3. Classes will be worth 50 points each.
b. Oral Reasons
    1. Two (2) sets of oral reasons will be given. The reasons classes will be designated at the beginning of the event by the co-chair advisors.
    2. Participants will have 15 minutes to judge these classes, at least 12 minutes to prepare reasons, and no more than 2 minutes to give the reasons.
    3. No notes will be permitted while delivering reasons.
    4. Reasons will be scored based on 50 points for a perfect score.

c. Two (2) of the following exercises--Pedigree Class, Sire Selection Exercise, Herd Record Evaluation or Written Dairy Management Exercise—will be completed on a rotational basis.

ROTATION OF ADDITIONAL DAIRY EXERCISES

2021 - Sire Selection & Written Exercise
2022 - Written Exercise & Pedigree
2023 - Herd Record Evaluation & Sire Selection
2024 - Pedigree & Herd Record Evaluation

1. Sire selection

    a. Sire selection exercise will consist of selecting for the mating of a dairy cow with the more appropriate bull.
    b. Linear evaluation information on the cows and/or sire information will be provided to each participant.
    c. Four bulls will be ranked (placed) for their potential/merits as the best choice to whom the cow should be bred.
    d. Fifteen (15) minutes will be allowed for this class.
    e. This class is worth 50 points.

2. Written dairy management exercise

    a. Written Dairy Management exercise will consist of 25 multiple choice questions.
    b. Ten questions will target the use of herd summaries to make management decisions. Information necessary to answer the questions will be provided on appropriate DHIA forms. The remaining questions will be concerned with various dairy management and industry related topics.
    c. Thirty (30) minutes will be allowed to complete this section of the contest.
    d. This exam is worth 50 points.

3. Pedigree Evaluation

    a. The pedigree evaluation class (no animals present) will consist of pedigrees of four cows/bulls for evaluation and placing by the participant.
    b. Pedigrees are to be evaluated to the degree they indicate the animal's ability to transmit production type traits to its offspring. Completeness, accuracy, level of performance and profitability are factors to consider in evaluating pedigrees.
    c. Fifteen (15) minutes is allowed for this exercise.
    d. This class will be worth 50 points.

4. Dairy Herd Evaluation

    a. The Dairy Herd Evaluation section of this event requires analysis of individual cow production records (DHIA) of a 50 - 75 cow herd.
    b. Ten questions will be asked.
    c. Thirty (30) minutes will be allowed.
    d. This class is worth 5 points per question for a total of 50 points.

5. Resources

a. Previous years tests found on ndffa.org
b. National CDE tests

6. Scoring

Activities	Individual Points	Team Points
Placing Classes (6 @ 50/Each)	300	900
Oral Reasons (2 @ 50)	100	300
Additional 2 exercises (2 @ 50)	100	300
Maximum Points	500	1500

7. Awards

a. Individual

1. Individual scores will be tabulated and broken into gold, silver, and bronze award areas.
2. Individual ties will not be broken.
3. The high individual receives the "baby bison" trophy and a $100 stipend from the ND FFA Foundation.

a. Team

1. Team scores will be tabulated by adding all three team 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 FFA Dairy Cattle Evaluation & Management CDE. 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:
    i. Oral Reasons Team Score
    ii. Placing Team Score

Universal Form C #705C-1

Incorrect Marks Correct Mark

Team Name / Additional Info

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

Team #

State

Last Name

First Name

Code

Placing Classes

Mark one answer in each column!

	1	2	3	4	5	6	
1	1234						1234
2	1243						1243
3	1324						1324
4	1342						1342
5	1423						1423
6	1432						1432
7	2134						2134
8	2143						2143
9	2314						2314
10	2341						2341
11	2413						2413
12	2431						2431
13	3124						3124
14	3142						3142
15	3214						3214
16	3241						3241
17	3412						3412
18	3421						3421
19	4123						4123
20	4132						4132
21	4213						4213
22	4231						4231
23	4312						4312
24	4321						4321
	1	2	3	4	5	6	

Keep/Cull 1

#	Keep	Cull
1	K	C
2	K	C
3	K	C
4	K	C
5	K	C
6	K	C
7	K	C
8	K	C

Mark 4 Keeps and 4 Culls!

Keep/Cull 2

#	Keep	Cull
1	K	C
2	K	C
3	K	C
4	K	C
5	K	C
6	K	C
7	K	C
8	K	C

Mark 4 Keeps and 4 Culls!

Keep/Cull 3

#	Keep	Cull
1	K	C
2	K	C
3	K	C
4	K	C
5	K	C
6	K	C
7	K	C
8	K	C

Mark 4 Keeps and 4 Culls!

Keep/Cull 4

#	Keep	Cull
1	K	C
2	K	C
3	K	C
4	K	C
5	K	C
6	K	C
7	K	C
8	K	C

Mark 4 Keeps and 4 Culls!

Judge 1

Judge 2

Judge 3

Judge 4

Exam 1

1	A	B	C	D	E	26	A	B	C	D	E
2	A	B	C	D	E	27	A	B	C	D	E
3	A	B	C	D	E	28	A	B	C	D	E
4	A	B	C	D	E	29	A	B	C	D	E
5	A	B	C	D	E	30	A	B	C	D	E
6	A	B	C	D	E	31	A	B	C	D	E
7	A	B	C	D	E	32	A	B	C	D	E
8	A	B	C	D	E	33	A	B	C	D	E
9	A	B	C	D	E	34	A	B	C	D	E
10	A	B	C	D	E	35	A	B	C	D	E
11	A	B	C	D	E	36	A	B	C	D	E
12	A	B	C	D	E	37	A	B	C	D	E
13	A	B	C	D	E	38	A	B	C	D	E
14	A	B	C	D	E	39	A	B	C	D	E
15	A	B	C	D	E	40	A	B	C	D	E
16	A	B	C	D	E	41	A	B	C	D	E
17	A	B	C	D	E	42	A	B	C	D	E
18	A	B	C	D	E	43	A	B	C	D	E
19	A	B	C	D	E	44	A	B	C	D	E
20	A	B	C	D	E	45	A	B	C	D	E
21	A	B	C	D	E	46	A	B	C	D	E
22	A	B	C	D	E	47	A	B	C	D	E
23	A	B	C	D	E	48	A	B	C	D	E
24	A	B	C	D	E	49	A	B	C	D	E
25	A	B	C	D	E	50	A	B	C	D	E

Exam 2

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

Exam 3

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

Identification

1	2	3	4	5	6	7	8	9	10
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1
2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2
3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3
4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5
6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

11	12	13	14	15	16	17	18	19	20
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1
2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2
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6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
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8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

21	22	23	24	25	26	27	28	29	30
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1
2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2
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7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

31	32	33	34	35	36	37	38	39	40
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
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5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5
6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

41	42	43	44	45	46	47	48	49	50
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1
2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2
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5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5
6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

51	52	53	54	55	56	57	58	59	60
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1
2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2
3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3
4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5
6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

FFA REASONS CARD

Contestant's Name | Chapter Number

Class Name

Contestant's Placing is to be indicated by **CIRCLING** the appropriate letter.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4
2	2	3	3	4	4	1	1	3	3	4	4	1	1	2	2	4	4	1	1	2	2	3	3
3	4	2	4	2	3	3	4	1	4	1	3	2	4	1	4	1	2	2	3	1	3	1	2
4	3	4	2	3	2	4	3	4	1	3	1	4	2	4	1	2	1	3	2	3	1	2	1

Placing Score | Reasons Score

FFA REASONS CARD

Contestant's Name | Chapter Number

Class Name

Contestant's Placing is to be indicated by **CIRCLING** the appropriate letter.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4
2	2	3	3	4	4	1	1	3	3	4	4	1	1	2	2	4	4	1	1	2	2	3	3
3	4	2	4	2	3	3	4	1	4	1	3	2	4	1	4	1	2	2	3	1	3	1	2
4	3	4	2	3	2	4	3	4	1	3	1	4	2	4	1	2	1	3	2	3	1	2	1

Placing Score | Reasons Score

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Contestant's Name | Chapter Number

Class Name

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A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4
2	2	3	3	4	4	1	1	3	3	4	4	1	1	2	2	4	4	1	1	2	2	3	3
3	4	2	4	2	3	3	4	1	4	1	3	2	4	1	4	1	2	2	3	1	3	1	2
4	3	4	2	3	2	4	3	4	1	3	1	4	2	4	1	2	1	3	2	3	1	2	1

Placing Score | Reasons Score

FFA REASONS CARD

Contestant's Name | Chapter Number

Class Name

Contestant's Placing is to be indicated by **CIRCLING** the appropriate letter.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4
2	2	3	3	4	4	1	1	3	3	4	4	1	1	2	2	4	4	1	1	2	2	3	3
3	4	2	4	2	3	3	4	1	4	1	3	2	4	1	4	1	2	2	3	1	3	1	2
4	3	4	2	3	2	4	3	4	1	3	1	4	2	4	1	2	1	3	2	3	1	2	1

Placing Score | Reasons Score

	CS.02.05.03.c. Exhibit self- confidence while in the workplace.	presentation	
CS.03.01. Performance Indicator: Communication: Demonstrate oral, writ- ten and verbal skills.			Language Arts: 4, 5 and 12
	CS.03.01.01.c. Demonstrate technical and business writing skills to communicate effectively with co-workers and supervisors.	written plan	
	CS.03.01.03.c. Make effective business presentations.	presentation	
	Performance Measurement Levels	Event Activity Addressing Measurement	Related Academic Standards
ABS.07.02. Performance Indicator: Develop a production and operational plan.			Language Arts: 4, 5, 6 and 12
	ABS.07.02.01.b. Evaluate the components of a production and operational plan and then revise an existing plan.	team activity	
	ABS.07.02.02.a. Identify common resources needed to operate a production facility.	team activity	
ABS.07.03. Performance Indicator: Utilize appropriate techniques to deter- mine the most likely strengths, weaknesses and inconsistencies in a business plan and relate these to risk management strategies.			Language Arts: 12
	ABS.07.03.01.b. Describe approaches to use in revising a business plan for improved consistency and realism.	team activity	
AS.01.01. Performance Indicator: Evaluate the development and implications of animal origin, domestication and distribution.			Science: C3 Social Studies: 7h
	AS.01.01.02.a. Define major components of the animal industry.	exam	
AS.02.02. Performance Indicator: Apply principles of comparative anatomy and physiology to uses within various animal systems.			Science: C1, C5 and F2
	AS.02.02.01.c. Explain how the components and systems of animal anatomy and physiology relate to the production and use of animals.	team activity	
AS.02.03. Performance Indicator: Select animals for specific purposes and maximum performance based on anatomy and physiology.			Science: C5
	AS.02.03.01.c. Evaluate and select animals to maximize performance based on anatomical and physiological characteristics that affect health, growth and reproduction.	evaluation	
	AS.02.03.02.c. Develop efficient procedures to pro- duce consistently high-quality animals, well suited for their intended purposes.	team activity	
AS.03.01. Performance Indicator: Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.			Science: C4, F1 and F5

	AS.03.01.02.a. Identify common diseases, parasites and physiological disorders that affect animals.	exam, team activity	
	AS.03.01.03.b. Evaluate preventive measures for controlling and limiting the spread of diseases, parasites and disorders among animals.	team activity	
AS.03.02. Performance Indicator: Provide for the biosecurity of agricultural animals and production facilities.			Science: F5 and F6 Social Studies: 9d
	AS.03.02.01.a. Explain the importance of biosecurity to the animal industry.	exam	
	AS.03.02.01.b. Discuss procedures at the local, state and national levels to ensure biosecurity of the animal industry.	team activity	
AS.04.01. Performance Indicator: Formulate feed rations to provide for the nutritional needs of animals.			Math: 1C and 6B Science: A4 and C5
	AS.04.01.01.b. Determine the relative nutritional value of feedstuffs by evaluating their general quality and condition.	exam	
	AS.04.01.01.c. Select appropriate feedstuffs for animals based on factors such as economics, digestive system and nutritional needs.	team activity	
	AS.04.01.02.a. Explain the importance of a balanced ration for animals.	exam	
	AS.04.01.02.b. Appraise the adequacy of feed rations using data from the analysis of feedstuffs, animal requirements and performance.	team activity	
AS.04.02. Performance Indicator: Prescribe and administer animal feed additives and growth promotions in animal production.			Science: C5
	AS.04.02.01.b. Discuss how feed additives and growth promotions are administered and the precautions that should be taken.	exam, team activity	
AS.05.01. Performance Indicator: Evaluate the male and female reproductive systems in selecting animals.			Science: C1 and C3
	AS.05.01.01.a. Explain the male and female reproductive organs of the major animal species.	exam	
AS.05.02. Performance Indicator: Evaluate animals for breeding readiness and soundness.			Science: C6
	AS.05.02.02.c. Treat or cull animals with reproductive problems.	exam, team	

AS.05.03. Performance Indicator: Apply scientific principles in the selection and breeding of animals.			Math: 6C Science: A4, C2 and E2
	AS.05.03.01.c. Select a breeding system based on the principles of genetics.	team activity	
	AS.05.03.02.c. Select animal breeding methods based on reproductive and economic efficiency.	team activity	
	AS.05.03.03.a. Explain the use of quantitative breeding values (e.g., EPDs) in the selection of genetically superior breeding stock.	exam	
	AS.05.03.03.c. Select animals based on quantitative breeding values for specific characteristics.	team activity	
	AS.05.03.04.b. Explain the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer.	exam, team activity	
	AS.05.03.05.b. Explain the materials, methods and processes of artificial insemination.	exam, team	
AS.07.01. Performance Indicator: Design animal housing, equipment and handling facilities for the major systems of animal production.			Science: C6 and F6
	AS.07.01.01.b. Critique designs for an animal facility and prescribe alternative layouts and adjustments for the safe and efficient use of the facility.	team activity	
	AS.07.01.02.b. Explain how modern equipment and handling facilities enhance the safe and economic production of animals.	team activity	
AS.08.01. Performance Indicator: Reduce the effects of animal production on the environment.			Science: C4 and F4
	AS.08.01.01.a. Evaluate the effects of animal agriculture on the environment.	exam	
	AS.08.01.01.b. Outline methods of reducing the effects of animal agriculture on the environment.	team activity	
AS.08.02. Performance Indicator: Evaluate the effects of environmental conditions on animals.			Science: C6 and F4
	AS.08.02.01.a. Identify optimal environmental conditions for animals.	exam	
	AS.08.02.01.b. Describe the effects of environmental conditions on animal populations and performance.	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.	presentation	

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.	presentation	
CS.02.05. Performance Indicator: Emotional Growth: Demonstrate healthy responses to one's feelings.			Social Studies: 4a

Appendix B: Related Academic Standards- Dairy Cattle

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

1. Standard and Expectations: Number and Operations
   1C. Compute fluently and make reasonable estimates.
6. Standard and Expectations: Problem Solving
   6B. Solve problems that arise in mathematics in other contexts.
   6C. Apply and adapt a variety of appropriate strategies to solve problems.

Science

A. Content Standard: Science as an Inquiry
   A4. Formulate and revise scientific explanations and models using logic and evidence.
C. Content Standard: Life Science
   C1. The cell.
   C2. Molecular basis of heredity.
   C3. Biological evolution.
   C4. Interdependence of organisms.
   C5. Matter, energy and organization in living systems. C6. Behavior of organisms.
E. Content Standard: Science and Technology
   F4. Environmental quality.
   F5. Natural and human-induced hazards.
   F6. Science and technology in local, national and global challenges. E2. Understanding about science and technology.

F. Content Standard: Science in Personal and Social Perspectives

F1. Personal and community health.

F2. Population growth.

English Language Arts

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.

6. Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language and genre to create, critique and discuss print and non-print texts.

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

7. Thematic Strand: Production, Distribution and Consumption

7h. apply economic concepts and reasoning when evaluating historical and contemporary social developments and issues;