

MEATS EVALUATION

Purpose

The meat industry is an important component in Missouri agriculture. The Meat Identification and Judging Career Development Event was developed to encourage secondary agriculture students to develop skills and abilities needed to enter and advance in careers in the meat industry.

Objectives

The State Agriculture Meat Identification and Judging CDE is designed to:

- I. Develop employment knowledge for students who are interested in exploring and pursuing a career in the meat industry.
- II. Aid the local agriculture instructor in motivating students to become involved in the industry of animal marketing and merchandising.
- III. Encourage the development of broader analytical skills, critical thinking strategies, and an understanding of appropriate meat terminology for high school students.
- IV. Develop the students' ability to evaluate meat animal products in order to optimize economic returns to producers and industry as well as to meet the needs of the consumer.

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.	Develop employment knowledge for students who are interested in exploring and pursuing a career in the meat industry.	CA.3 MA.1, MA.3	1.5 3.5, 3.6, 3.8
2.	Aid the local agriculture instructor in motivating students to become involved in the industry of animal marketing and merchandising.	SC.3 SS.4	4.4, 4.7, 4.8
3.	Encourage the development of broader analytical skills, critical thinking strategies, and an understanding of appropriate meat terminology for high school students.		
4.	Develop the students' ability to evaluate meat animal products in order to optimize economic returns to producers and industry as well as to meet the needs of the consumer.		

CORRESPONDING SECONDARY AGRICULTURE CURRICULUM			
Course and/or Curriculum:	Agriculture Science I	Unit(s):	Introduction to Animal Products
	Food Science and Technology		Unit II – Food Processing Lesson 6 – Products and By-Products from Meat Animals Lesson 7 – Processing Meat Animals Lesson 8 – Quality Grades, Inspections, and Brand Names in Meat Industry

Event Format

1. The Meat Evaluation CDE shall consist of the following four (4) components:
2. Identification of Retail Cuts of Meat -
 - a. Forty (40) various retail cuts of meat and variety meats from Beef, Lamb, and Pork will be placed in a convenient manner and given an identification number.
 - b. Contestants will identify the species, primal cut, and retail name of each cut as listed on LIST 7 – Primal/Retail Cuts Coding.
 - c. Approximately one minute for each cut will be the time allowed for identification.
3. Judging Classes of Meat -
 - a. Four (4) classes will be judged, each consisting of four (4) samples.
 - b. Classes may be carcasses of beef, pork, or lamb; primal cuts of beef or pork; retail cuts of beef or pork.
 - c. Primal cuts may include fresh hams, pork loins, pork Boston shoulders (butts), pork picnic shoulders, beef ribs, beef chucks, beef loins, beef rounds, beef strip loins, and beef rib eye roasts.
 - d. Ten questions will be required on one of the judging classes. The format will be a 50 point multiple choice/true-false test relating to placing the class.
Example: Which rib eye has the highest degree of marbling?
a. 1 b. 2 c. 3 d. 4
4. Multiple Choice Exam - The test will consist of 20 multiple choice questions based on the Meats Units available from IML.
5. Meats Formulation Problem – Contestants will complete an industry-based practicum requiring them to select the lowest cost method of developing a further-processed meat product. Points will be earned for selecting the correct formulation and answering multiple choice questions relating to the data provided within the practicum.

Event Scoring

Event	Points
Identification of Retail Cuts of Meat – 40 @ 6 points each	240 points
Judging Classes – 4 classes @ 50 points each	200 points
Questions on one Judging Class – 10 questions @ 5 points each	50 points
Written Test – 20 questions @ 3 points each	60 points
Meat Formulation Problem –	50 points
TOTAL	600 points

1. Tie scores among teams will be broken using the high individual team member's score. In case the scores are tied, the scores of the second high individual on each team should be used.

Event Rules and Regulations

1. Contestants must not communicate with each other while the event is in progress.
2. All coaches, alternates, and others, except the superintendent, his/her assistants, contestants, and the judges will be excluded from the Meats Laboratory. Any assistance given a team member from any source during the contest will be sufficient cause to eliminate that team from the contest.
3. Official placing and discussion of classes will be held immediately following the event. Instructors, contestants, alternates and other interested persons are encouraged to attend.

4. **Contestants must come to the event prepared to work in a cold storage facility with a room temperature of 40°F. They should have heavy sweaters, coats, or other warm clothes. Contestants must wear a clean head cover. While hard hats are the industry norm, a clean baseball cap is acceptable. Otherwise contestants should have hairnets. Ideally contestants should have white, lightweight frocks; disposable frocks can be used. Closed-toed shoes are also required; NO sandals, flip-flops, etc.**
5. 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

Yellow Pages – American Meat Institute, P.O. Box 3556, Washington, D.C. 20007. Phone: 703-841-2400.

National Association of Meat Purveyors (1988). The Meat Buyers Guide. 8365-B Greensboro Drive, McLean, VA 22102; Phone: (703) 827-5754.

National Live Stock and Meat Board. Uniform Retail Meat Identify Standards. Department of Merchandising, National Live Stock and Meat Board, 444 North Michigan Ave., Chicago, IL 60611.

Introduction to Animal Products (1998). IML, 1400 Rock Quarry Rd. Q156, University of Missouri, Columbia, MO 65202. (800) 669-2465 <http://iml-ag.missouri.edu/>

Meat Evaluation Handbook. (National Cattlemen’s Beef Association 2001) IML, 1400 Rock Quarry Rd. Q156, University of Missouri, Columbia, MO 65202. (800) 669-2465 <http://iml-ag.missouri.edu/>

Meat Judging and Grading Revised 1998. IML, 1400 Rock Quarry Rd. Q156, University of Missouri, Columbia, MO 65202. (800) 669-2465. <http://iml-ag.missouri.edu/>

Meat Judging: Fundamentals - Video Active. IML, 1400 Rock Quarry Rd. Q156, University of Missouri, Columbia, MO. 65202. (800) 669-2465. <http://iml-ag.missouri.edu/>

National Career Development Events (2006-2010). National FFA Organization.

*Teams can prepare for the meats formulation problem using the provided sample problems or see the National Career Development Events Meat Evaluation and Technology Section for details (http://www.ffa.org/documents/cde_meats.pdf).

Forms

See the following: List 7, Form 7, Formulation Problem Solving Instructions/Sample.

LIST 7

PRIMAL - RETAIL CUTS CODING

PRIMAL CUTS	RETAIL CUTS	SPECIES	PRIMAL	RETAIL
BEEF				
BRISKET	Brisket, Whole (Bnls)	B	02	011
	Brisket, Corned	B	02	102
	Flat Half (Bnls)	B	02	020
	Point Half (Bnls)	B	02	027
CHUCK	Arm Roast	B	03	003
	Arm Pot Roast (Bnls)	B	03	004
	Arm Steak	B	03	046
	Arm Steak (Bnls)	B	03	047
	Blade Roast	B	03	006
	Blade Steak	B	03	048
	Chuck Eye Roast (Bnls)	B	03	014
	Mock Tender Roast	B	03	026
	Mock Tender Steak	B	03	054
	Seven (7) Bone Roast	B	03	031
	Seven (7) Bone Steak	B	03	059
Top Blade Steak (Bnls)	B	03	070	
FLANK	Flank Steak	B	04	053
LOIN	Porterhouse Steak	B	08	056
	Sirloin Steak	B	08	060
	Sirloin Steak (Bnls)	B	08	061
	T-Bone Steak	B	08	066
	Tenderloin Roast (Whole)	B	08	040
	Tenderloin Steak	B	08	067
	Top Loin Steak	B	08	071
	Top Loin Steak (Bnls)	B	08	072
Top Sirloin Steak (Bnls)	B	08	074	
PLATE	Short Ribs	B	09	033
	Skirt Steak (Bnls)	B	09	063
RIB	Eye Roast	B	10	018
	Eye Steak	B	10	051
	Large End Roast	B	10	024
	Small End Roast	B	10	037
	Small End Steak	B	10	064
	Small End Steak (Bnls)	B	10	065
ROUND	Bottom Round Roast (Bnls)	B	11	008
	Bottom Round Rump Roast (Bnls)	B	11	009
	Bottom Round Steak	B	11	049
	Eye Round Roast	B	11	019
	Eye Round Steak	B	11	052
	Heel of Round Roast	B	11	023
	Round Steak	B	11	057
	Round Steak (Bnls)	B	11	058
	Tip Roast	B	11	041
	Tip Roast, Cap Off	B	11	042
	Tip Steak	B	11	068
	Tip Steak, Cap Off	B	11	069
	Top Round Roast	B	11	045
Top Round Steak	B	11	073	
SHANK	Cross Cuts	B	12	016
	Cross Cuts (Bnls)	B	12	017
VARIETY MEATS	Brains	B	16	086
	Heart	B	16	087
	Kidney	B	16	088
	Liver	B	16	089
	Oxtail	B	16	090

PRIMAL CUTS	RETAIL CUTS	SPECIES	PRIMAL	RETAIL
	Sweetbread	B	16	091
	Tongue	B	16	092
	Tripe	B	16	093
VARIOUS	Beef for Stew	B	17	094
	Cube Steak	B	17	095
	Ground Beef	B	17	096
PORK, FRESH				
HAM/LEG	Center Slice	P	05	050
	Rump Portion	P	05	030
	Shank Portion	P	05	032
LOIN	Back Ribs	P	08	005
	Blade Chop	P	08	076
	Blade Chop (Bnls)	P	08	077
	Blade Roast	P	08	006
	Butterfly Chop	P	08	078
	Center Loin Roast	P	08	012
	Center Rib Roast	P	08	013
	Country Style Ribs	P	08	015
	Loin Chop	P	08	080
	Rib Chop	P	08	081
	Sirloin Chop	P	08	083
	Sirloin Cutlets	P	08	062
	Sirloin Roast	P	08	035
	Tenderloin Roast (Whole)	P	08	040
	Top Loin Chop	P	08	084
	Top Loin Chop (Bnls)	P	08	085
	Top Loin Roast (Bnls)	P	08	043
	Top Loin Roast Double (Bnls)	P	08	044
SHOULDER	Arm Picnic	P	13	002
	Arm Roast	P	13	003
	Arm Steak	P	13	046
	Blade, Boston	P	13	007
	Blade Steak	P	13	048
SIDE "BELLY"	Fresh Side	P	14	022
SPARERIBS	Spareribs	P	15	038
VARIETY MEATS	Heart	P	16	087
	Kidney	P	16	088
	Liver	P	16	089
	Tongue	P	16	092
VARIOUS	Cube Steak	P	17	095
	Ground Pork	P	17	097
	Hocks	P	17	098
	Sausage	P	17	099
	Sausage Links	P	17	100
PORK, SMOKED/CURED				
HAM/LEG	Center Slice	P	05	104
	Ham (Bnls)	P	05	105
	Ham (Whole)	P	05	106
	Rump Portion	P	05	112
	Shank Portion	P	05	113
JOWL	Jowl	P	06	108
LOIN	Back Ribs	P	08	101
	Canadian Bacon	P	08	103
	Loin Chop	P	08	109
	Rib Chop	P	08	111
SHOULDER	Picnic (Whole)	P	13	110
SIDE (BELLY)	Slab Bacon	P	14	114

PRIMAL CUTS	RETAIL CUTS	SPECIES	PRIMAL	RETAIL
	Sliced Bacon	P	14	115
SPARERIBS	Spareribs	P	15	116
VARIOUS	Hocks	P	17	107
LAMB				
BREAST	Breast	L	01	010
	Riblets	L	01	029
LEG	American Style Roast	L	07	001
	Center Slice	L	07	050
	Frenched Style Roast	L	07	021
	Sirloin Chop	L	07	083
	Sirloin Half	L	07	036
	Shank Portion	L	07	032
LOIN	Double Chop	L	08	079
	Loin Chop	L	08	080
	Loin Roast	L	08	025
RIB	Rib Chop	L	10	081
	Rib Chop (Frenched)	L	10	082
	Rib Roast	L	10	028
SHOULDER	Arm Chop	L	13	075
	Blade Chop	L	13	076
	Neck Slice	L	13	055
	Shoulder (Bnls)	L	13	034
	Square Cut (Whole)	L	13	039
VARIETY MEATS	Heart	L	16	087
	Kidney	L	16	088
	Liver	L	16	089
	Tongue	L	16	092

Meat Identification Card - Training Aid

Name: _____ Contestant Number: _____

School: _____ School Number: _____

Select: Species (1 point), Primal Cuts (2 points), and Retail Name (3 points) from listings below and fill in the column blanks beside the cut number. The score column is for tabulation only. Total - 240 points.

SPECIES – 1 point B=Beef P=Pork L=Lamb

Cut No.	Species	Primal	Retail	Score
1.				
2.				
3.				
4.				
5.				
6.				
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34.				
35.				
36.				
37.				
38.				
39.				
40.				

Primal Cuts – 2 Points			
01. Breast	06. Jowl	11. Round	16. Variety Meat
02. Brisket	07. Leg	12. Shank	17. Various
03. Chuck	08. Loin	13. Shoulder	
04. Flank	09. Plate	14. Side "Belly	
05. Ham/Leg	10. Rib	15. Spareribs	

Retail Cuts – 3 Points		Variety Meats
Roasts/Pot Roasts		
001. American Style	44. Top Loin Roast Double (Bnls)	086. Brains
002. Arm Picnic	45. Top Round Roast	087. Heart
003. Arm Roast		088. Kidney
004. Arm Pot Roast (Bnls)		089. Liver
005. Back Ribs	Steaks	090. Oxtail
006. Blade Roast	046. Arm Steak	091. Sweetbread
007. Blade, Boston	047. Arm Steak (Bnls)	092. Tongue
008. Bottom Round Roast (Bnls)	048. Blade Steak	093. Tripe
009. Bottom Round Rump Roast (Bnls)	049. Bottom Round Steak	
010. Breast	050. Center Slice	Various
011. Brisket, Whole (Bnls)	051. Eye Steak	094. Beef for Stew
012. Center Loin Roast	052. Eye Round Steak	095. Cube Steak
013. Center Rib Roast	053. Flank Steak	096. Ground Beef
014. Chuck Eye Roast (Bnls)	054. Mock Tender Steak	097. Ground Pork
015. Country Style Ribs	055. Neck Slice	098. Hocks
016. Cross Cuts	056. Porterhouse Steak	099. Sausage
017. Cross Cuts (Bnls)	057. Round Steak	100. Sausage Links
018. Eye Roast	058. Round Steak (Bnls)	
019. Eye Round Roast	059. Seven (7) Bone	Smoked/Cured Meats
020. Flat Half (Bnls)	060. Sirloin Steak	101. Back Ribs
021. Frenched Style Roast	061. Sirloin Steak (Bnls)	102. Brisket, Corned
022. Fresh Side	062. Sirloin Cutlets	103. Canadian Bacon
023. Heel of Round Roast	063. Skirt Steak (Bnls)	104. Center Slice
024. Large End Roast	064. Small End Steak	105. Ham (Bnls)
025. Loin Roast	065. Small End Steak (Bnls)	106. Ham (Whole)
026. Mock Tender Roast	066. T-Bone Steak	107. Hocks
027. Point Half (Bnls)	067. Tenderloin Steak	108. Jowl
028. Rib Roast	068. Tip Steak	109. Loin Chop
029. Riblets	069. Tip Steak, Cap Off	110. Picnic (Whole)
030. Rump Portion	070. Top Blade Steak (Bnls)	111. Rib Chop
031. Seven (7) Bone Roast	071. Top Loin Steak	112. Rump Portion
032. Shank Portion	072. Top Loin Steak (Bnls)	113. Shank Portion
033. Short Ribs	073. Top Round Steak	114. Slab Bacon
034. Shoulder (Bnls)	074. Top Sirloin (Bnls)	115. Sliced Bacon
035. Sirloin Roast	Chops	116. Spareribs
036. Sirloin Half	075. Arm Chop	
037. Small End Roast	076. Blade Chop	
038. Spare Ribs	077. Blade Chop (Bnls)	
039. Square Cut (Whole)	078. Butterfly Chop	
040. Tenderloin Roast (Whole)	079. Double Chop	
041. Tip Roast	080. Loin Chop	
042. Tip Roast, Cap Off	081. Rib Chop	
043. Top Loin Roast (Bnls)	082. Rib Chop (Frenched)	
	083. Sirloin Chop	
	084. Top Loin Chop	
	085. Top Loin Chop (Bnls)	

MEATS FORMULATION PROBLEM SOLVING INSTRUCTIONS/SAMPLE

Students will be given a situational problem solving the least-cost formulation of a batch of particular meat products (hamburger, wiener, bologna, etc.). This problem will be worth 50 points and consist of procedural questions and the actual determination of the least-cost price.

GROUND BEEF FORMULATION PROBLEM TRAINING MATERIALS

Assume that you manage a meat plant that manufactures ground beef or a chain of retail stores. Your goal is to produce a fresh, wholesome product that complies with all meat inspection regulations and will have three days' shelf life in the meat case. The fat content must comply with the specifications of the stores. The cost of the product should be as low as possible.

Ground Beef Regulations (USDA)

GROUND BEEF: The terms "Ground Beef" and "Chopped Beef" are synonymous. Products so labeled must be made with fresh and/or frozen beef with or without seasoning, and without the addition of fat as such, and shall contain no more than 30% fat. It may contain added water, binders or extenders. It may contain beef cheek meat not to exceed 25%. Heart meat and tongue meat are not acceptable ingredients.

If the name is qualified by the name of a particular cut, such as "Ground Beef Round" or "Beef Chuck, Ground", the product must consist entirely of meat from the particular cut or part.

Industry Guidelines on Ground Beef Manufacture

1. To get the most desirable color and maximum shelf life, all boneless meats used to manufacture ground beef shall be fresh (not frozen), well chilled (temperature no higher than 35°F) and shall arrive at the plant within 96 hours of animal slaughter.
2. A least-cost determination shall be performed on acceptable meat ingredients to select those meats that produce the lowest-cost product that meets all ground beef guidelines.
3. To simplify the grinding and blending operation, only two meat ingredients will be used for each batch.
4. Rounding of decimals: 5-9 will be rounded up; 1-4 will be rounded down.

SAMPLE PROBLEM ONE

Use the Pearson Square to formulate a batch of ground beef to the desired fat content.

Meats:

- (1) Boneless cow meat (10% fat-\$.99/lb.)
- (2) 75% lean beef trimmings (25% fat-\$.79/lb.)

Desired Final Fat Content: 20%
Batch Size: 1,000 lbs.

Determine:

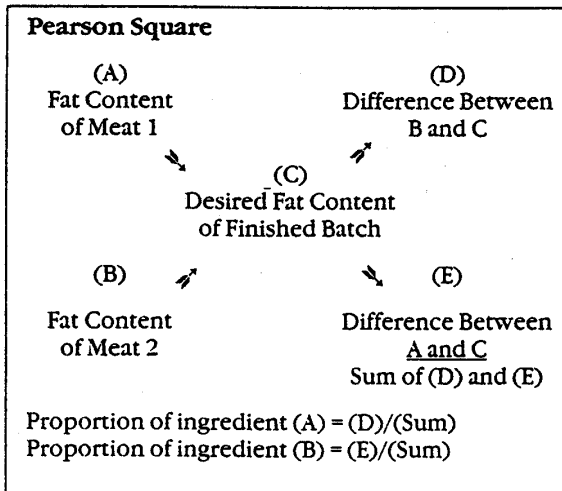
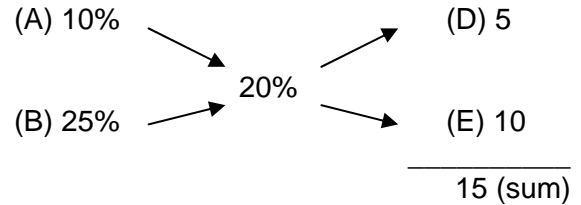
- a. The amounts of the two types of meat that must be blended together to give the desired fat content.
- b. The meat cost of the finished product.*

**NOTE: You will only be determining meat costs. In an actual situation overhead cost must also be added to the cost of the ground beef to account for labor, equipment, transportation, etc. In this exercise the student need not be concerned with these overhead costs.*

To simplify this grinding and blending operation, only two meat ingredients will be used for each batch.

Rounding of decimals: 5-9 will be rounded up: 1-4 will be rounded down.

For Preceding Information:



SAMPLE PROBLEM TWO

You must follow all government regulations and company policies listed in the training materials. Determine which available ingredients to use (and at what levels) to make the lowest-priced ground beef acceptable.

Specifications:

Desired fat content of finished product is 18%
 Batch Size = 5,000 lbs.
 Manufacturing date = February 10
 No product over 5 days old may be used.
 No; variety meats may be used.
 No product over 35°F may be used.

Boneless Meat Ingredients Available

	Slaughter Fat		Cont.	Price
	Date	Temp		
Bull meat	Feb.6	33°F	8%	\$1.05
Boneless Chuck	Feb. 7	35°F	14%	\$1.00
75% lean trim	Feb. 4	32°F	25%	\$0.75
50% lean trim	Feb. 6	31°F	50%	\$0.55
Beef chuck meat	Feb. 7	37°F	12%	\$0.70
Beef hearts	Feb. 6	32°F	15%	\$0.35

Solution:

Do all potential ingredients meet government regulations and company specifications?

Acceptable

Bull meat
 Boneless chuck
 50% lean trim

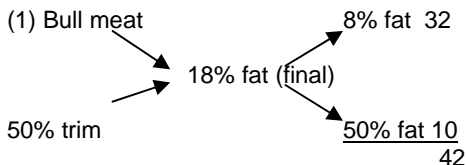
Not Acceptable

75% lean trim (too old)
 Chuck meat (too warm)
 Beef hearts (not allowed)

Therefore, to produce desired fat content, product could be made from either of the following two combinations:

- (1) Bull meat and 50% lean trim
- (2) Boneless chuck and 50% lean trim

Which combination results in the lowest meat cost?

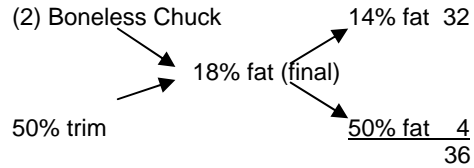


Proportions:

Bull meat = $32/42 = 0.76$ or 3,800 lbs.
 50% trim = $10/42 = 0.24$ or 1,200 lbs.
 5,000 lbs.

Costs:

Bull meat $0.76 \times \$1.05 = \0.798
 50% trim $0.24 \times \$0.55 = \underline{\$0.132}$
 \$0.93 or \$.93/lb.



Proportions:

Boneless chuck = $32/36 = 0.89$ or 4,450 lbs.
 50% trim = $4/36 = 0.11$ or 550 lbs.
 5,000 lbs.

Cost:

Bull meat $0.89 \times \$1.00 = \0.89
 50% trim $0.11 \times \$0.55 = \underline{\$0.06}$
 \$0.95 or \$.95/lb.

Final Solution --Meats to be Used:

Bull meat 3,800 lbs.
 50% trim 1,200 lbs.

Meat costs: \$0.93 per pound

Scoring:

The answer to the formulation problem will count ten points. There will be an additional eight questions, worth five points each. To facilitate computer scoring of this exercise, participants will be given a list of ten or more meat price combinations and be required to select the correct one, based on the above calculation. All problems will be worked to three decimal places and rounded to two places. If the third decimal is 5 or more, the number will be rounded up.

Answers to the eight additional questions will be selected from four choices.

SAMPLE TEST ITEMS FOR SAMPLE PROBLEM TWO

Check the correct solution:

1. Bull and chuck meat (0.89)
2. Boneless chuck and 75% lean trim (0.91)
3. Bull meat and 50% lean trim (0.93)
4. Boneless chuck and 50% lean trim (0.90)
5. Bull meat and 50% lean trim (0.88)
6. Beef hearts and 75% lean trim (0.68)
7. Bull meat and 50% lean trim (0.97)
8. Beef chuck meat and bull meat (1.04)
9. 75% lean trim and 50% lean trim (0.67)
10. 50% lean trim and bull meat (0.87)