

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. One minute will be provided for each cut will be the time allowed for identification with 5 minutes to review cuts. There will be 10 minutes provided at the end of the CDE to complete the scantron (bubbling).
 - d. **Duplicate samples may not be used in any identification portion of the event.**
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 or pork; 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. Students will be allowed to reference their notes when answering questions. 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 test references. All questions on the meats test must relate to beef, pork, lamb, meat history, and industry history.
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. **The Formulation Problem is to have a correct formulation solution that includes only two (2) ingredients.**
 - ⇒ The ingredients will be cuts on the CDE Event list, lean trimmings from any of the three species of animals included on the contest, variety meats, cheek meat & trim and course grinds from the species in the CDE Event.
 - ⇒ This may include, but is not limited to, the following examples:
 - Fresh lamb shoulder
 - Beef Cheek Meat
 - Point Half Brisket
 - Pork Heart
 - 80/20 Beef fine grind
 - ⇒ This list would not include cuts of:
 - Goose Neck Round
 - London Broil
 - New York Strip
 - ETC.

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 or lower.**
 - A. Required attire includes:
 1. Closed-toed shoes,
 2. Clean head cover; which may include hard hats, clean baseball caps, or hairnets,
 3. Long pants or skirts that cover the entire leg.
 - B. Suggested attire:
 - white lightweight frocks,
 - disposable frocks,
 - heavy sweaters, coats, and/or other warm clothes.
5. Any non-graphing and non-programable calculators may be used.
6. Contestants will be allowed to bring steno-pads, but must be CLEAN or NOT WRITTEN ON prior to the start of the event.

Test References

Introduction to Animal Products (1998). IML available via MCCE website:

<http://dese.mo.gov/college-career-readiness/career-education/agricultural-education/agricultural-education>

Meat Evaluation Handbook. Smith, Gary, et al. American Meat Science Association. July 17, 2013.

<http://www.meatscience.org/students/meat-judging-program/meat-judging-resources/meat-evaluation-handbook>

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

<http://www.meatbuyersguide.com/Account/Login.aspx?ReturnUrl=>

Training References

National Cattlemen's Beef Association. The Guide to Identifying Meat Cuts. Research, Education, and Innovation Department, 9110 East Nichols Avenue, Suite 300, Centennial, CO 80112.

https://www.beefresearch.org/CMDocs/BeefResearch/PE/GuideToID_MeatCuts.pdf
www.beefresearch.org www.beef.org

Forms

See the following: Training Reference, Contestant Reference Sheet, Formulation Problem Solving Instructions/Sample.

Training Reference

PRIMAL - RETAIL CUTS CODING
PRIMAL / RETAIL CUTS CODING

PRIMAL CUTS	RETAIL CUTS	SPECIES	PRIMAL CODE	RETAIL CODE
BEEF				
Brisket	Corned Brisket	B	2	90
	Flat Half (Bnls)	B	2	15
	Brisket, Whole	B	2	10
Chuck	7-Bone Pot-Roast	B	3	26
	Arm Pot Roast	B	3	3
	Arm Pot Roast (Bnls)	B	3	4
	Blade Roast	B	3	6
	Chuck Eye Roast (Bnls)	B	3	13
	Chuck Eye Steak (Bnls)	B	3	45
	Mock Tender Roast	B	3	20
	Mock Tender Steak	B	3	48
	Petite Tender	B	3	21
	Shoulder Pot Roast (Bnls)	B	3	29
	Top Blade Steak (Flat Iron)	B	3	59
Flank	Flank Steak	B	4	47
Loin	Porterhouse Steak	B	7	49
	T-Bone Steak	B	7	56
	Tenderloin	B	7	34
	Tenderloin Steak	B	7	57
	Top Loin Steak	B	7	60
	Top Loin Steak (Bnls)	B	7	61
	Top Sirloin Cap Steak (Bnls)	B	7	65
	Top Sirloin Steak (Bnls) Cap Off	B	7	64
	Top Sirloin Steak (Bnls)	B	7	63
	Tri Tip Roast	B	7	40
Plate	Short Ribs	B	8	28
	Skirt Steak (Bnls)	B	8	55
Rib	Rib Roast	B	9	22
	Ribeye Roast (Bnls)	B	9	14
	Ribeye Steak (Bnls)	B	9	50

	Ribeye Steak Lip-On	B	9	51
Round	Bottom Round Roast	B	10	8
	Bottom Round Rump Roast	B	10	9
	Bottom Round Steak	B	10	43
	Eye Round Steak	B	10	46
	Round Steak	B	10	52
	Round Steak (Bnls)	B	10	53
	Tip Roast - Cap Off	B	10	36
	Tip Steak - Cap Off	B	10	58
	Top Round Roast	B	10	39
	Top Round Steak	B	10	62
Various	Beef for Stew	B	15	83
	Cubed Steak	B	15	84
	Ground Beef	B	15	85
Variety	Heart	B	14	77
	Kidney	B	14	78
	Oxtail	B	14	80
	Tongue	B	14	81
	Tripe	B	14	82
PORK				
Ham/Leg	Center Slice	P	5	44
	Fresh Ham Rump Portion	P	5	25
	Fresh Ham Shank Portion	P	5	27
	Smoked Ham (Bnls)	P	5	92
	Smoked Ham Center Slice	P	5	91
	Smoked Ham Rump Portion	P	5	97
	Smoked Ham Shank Portion	P	5	98
	Tip Roast (Bnls)	P	5	35
	Top Roast (Bnls)	P	5	38
Loin	Back Ribs	P	7	5
	Blade Chops	P	7	67
	Blade Chops (Bnls)	P	7	68
	Blade Roast	P	7	6
	Butterflied Chops (Bnls)	P	7	69
	Center Loin Roast	P	7	11

	Center Rib Roast	P	7	12
	Country Style Ribs	P	7	70
	Loin Chops	P	7	71
	Rib Chops	P	7	72
	Sirloin Chops	P	7	74
	Sirloin Cutlets	P	7	54
	Sirloin Roast	P	7	30
	Smoked Loin Chops	P	7	94
	Smoked Rib Chops	P	7	96
	Tenderloin	P	7	34
	Top Loin Chops	P	7	75
	Top Loin Chops (Bnls)	P	7	76
	Top Loin Roast (Bnls)	P	7	37
Shoulder	Arm Roast	P	11	2
	Arm Steak	P	11	41
	Blade Boston Roast	P	11	7
	Blade Steak	P	11	42
	Smoked Picnic, Whole	P	11	95
Side/Belly	Slab Bacon	P	12	99
	Sliced Bacon	P	12	100
	Fresh Side	P	12	17
Spareribs	Pork Spareribs	P	13	32
Various	Ground Pork	P	15	86
	Hock	P	15	87
	Cubed Steak	P	15	84
	Sausage/ Sausage Links	P	15	88
	Smoked Hock	P	15	93
Variety	Heart	P	14	77
	Kidney	P	14	78
	Liver	P	14	79
	Tongue	P	14	81
LAMB				
Breast	Ribs (Denver Style)	L	1	24
Leg	American Style Roast	L	6	1
	Center Slice	L	6	44
	Frenched Style Roast	L	6	16

	Leg Roast, Bnls	L	6	18
	Sirloin Chops	L	6	74
	Sirloin Half	L	6	31
Loin	Loin Chops	L	7	71
	Loin Roast	L	7	19
Rib	Rib Chops	L	9	72
	Rib Chops Frenched	L	9	73
	Rib Roast	L	9	22
	Rib Roast Frenched	L	9	23
Shoulder	Arm Chops	L	11	66
	Blade Chops	L	11	67
	Square Cut	L	11	33
Various	Shank	L	15	89
Variety	Heart	L	14	77
	Kidney	L	14	78
	Liver	L	14	79
	Tongue	L	14	81

Contestant Reference for use with the Meats Scantron

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.				
7.				
8.				
9.				
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11.				
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38.				
39.				
40.				

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

Retail Cuts – 3 Points

<u>Roasts/Pot Roasts</u>	<u>Steaks</u>	<u>Variety Meats</u>
001. American Style Rst.	041. Arm Steak	077. Heart
002. Arm Roast	042. Blade Steak	078. Kidney
003. Arm Pot Roast	043. Bottom Round Steak	079. Liver
004. Arm Pot Roast (Bnls)	044. Center Slice	080. Oxtail
005. Back Ribs	045. Chuck Eye Steak (Bnls)	081. Tongue
006. Blade Roast	046. Eye Round Steak	082. Tripe
007. Blade, Boston Roast	047. Flank Steak	
008. Bottom Round Roast	048. Mock Tender Steak	<u>Various</u>
009. Bottom Round Rump Roast	049. Porterhouse Steak	083. Beef for Stew
010. Brisket, Whole (Bnls)	050. Ribeye Steak (Bnls)	084. Cubed Steak
011. Center Loin Roast	051. Ribeye Steak, Lip-On	085. Ground Beef
012. Center Rib Roast	052. Round Steak	086. Ground Pork
013. Chuck Eye Roast (Bnls)	053. Round Steak (Bnls)	087. Hock
014. Ribeye Roast (Bnls)	054. Sirloin Cutlets	088. Sausage / Sausage Links
015. Flat Half (Bnls)	055. Skirt Steak (Bnls)	089. Shank
016. Frenched Style Roast	056. T-Bone Steak	
017. Fresh Side	057. Tenderloin Steak	<u>Smoked/ Cured Meats</u>
018. Leg Roast (Bnls)	058. Tip Steak, Cap Off	090. Corned Brisket
019. Loin Roast	059. Top Blade Steak (Flat Iron)	091. Smoked Ham, Center Slice
020. Mock Tender Roast	060. Top Loin Steak	092. Smoked Ham (Bnls)
021. Petite Tender	061. Top Loin Steak (Bnls)	093. Smoked Hock
022. Rib Roast	062. Top Round Steak	094. Smoked Loin Chops
023. Rib Roast, Frenched	063. Top Sirloin Steak (Bnls)	095. Smoked Picnic, Whole
024. Ribs (Denver Style)	064. Top Sirloin Steak (Bnls) Cap-Off	096. Smoked Rib Chops
025. Pork Fresh Ham Rump Portion	065. Top Sirloin Cap Steak (Bnls)	097. Smoked Ham, Rump Portion
026. 7-Bone Pot -Roast		098. Smoked Ham, Shank Portion
027. Pork Fresh Ham Shank Portion	<u>Chops</u>	099. Slab Bacon
028. Short Ribs	066. Arm Chops	100. Sliced Bacon
029. Shoulder Pot Roast (Bnls)	067. Blade Chops	
030. Sirloin Roast	068. Blade Chops (Bnls)	
031. Sirloin Half	069. Butterflied Chops (Bnls)	
032. Pork Spareribs	070. Country Style Ribs	
033. Square Cut	071. Loin Chops	
034. Tenderloin	072. Rib Chops	
035. Tip Roast (Bnls)	073. Rib Chops Frenched	
036. Tip Roast – Cap Off	074. Sirloin Chops	
037. Top Loin Roast (Bnls)	075. Top Loin Chops	
038. Top Roast (Bnls)	076. Top Loin Chops (Bnls)	
039. Top Round Roast		
040. Tri Tip Roast		

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:

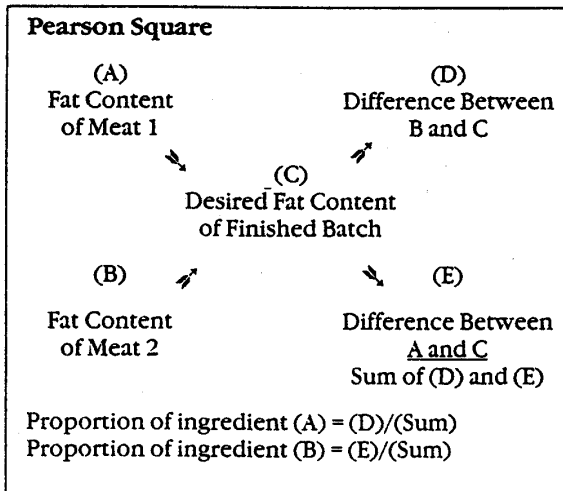
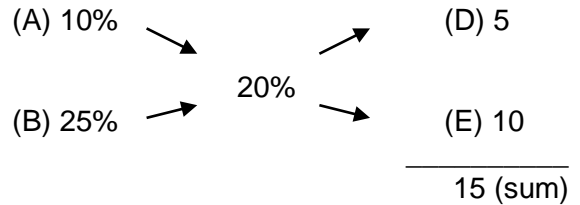
- a. The amounts of the two types of meat that must be blended together to give the desired fat content.
- b. The meat cost of the finished product.*

**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

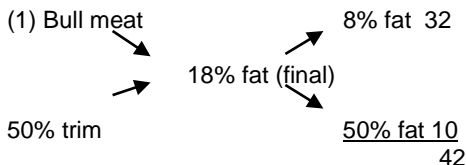
Not Acceptable

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?

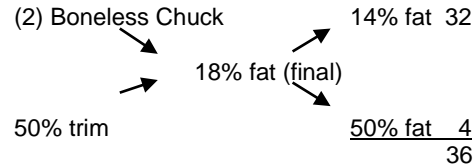


Proportions:

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 = \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 = \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)