



Meats Evaluation CDE

Purpose

The purpose of the Meat Evaluation & Technology Career Development Event is to stimulate interest, encourage proficiency development and recognize student excellence in the meat industry as taught through the agricultural education curriculum. This event is designed to provide members with a better understanding of the meat processing industry and increase their knowledge of retail cuts and their quality.

Sponsor

Micro Summit Processors currently sponsors this event.

State Event Superintendent

State agricultural education staff will designate the superintendent for this event.

Comments or questions may also be directed to Mrs. Allison Jennings, Eastern Region Agricultural Education Coordinator, 501 S. 2nd Street, Smithfield, NC 27577, 919-934-1017 ex 4094, email: Allison_jennings@ncsu.edu

Eligibility and General Guidelines

This event will be held during the North Carolina State FFA Convention. FFA Members may not participate in a Career Development Event that leads to a state level event after July 1, following their high school/early college graduation. This event is open to all FFA chapters and FFA members in good standing. Members winning a previous state event in this area or that have participated in a previous national event in this area are ineligible.

Teams must consist of three individuals. All three individual's scores count toward the overall team score. Alternates are not allowed to participate and any alternate found participating in a state event will result in team disqualification.

FFA members in good standing may also participate as individuals in this event. A chapter may have up to two members participate as individuals as long as the chapter does not have a team participating in the event. Their scores will only count toward individual recognition and will not be tallied as a team score.

The use or possession of cellular phones, Personal Digital Assistants (PDAs) or any other mobile electronic communication device is prohibited during any state-level career development event. Any violation of this rule by any team member will result in total team disqualification.

FFA members participating in career development events that require the use of calculators may only use non-programmable/graphing calculators that do not have the ability to communicate with other calculators. Calculators will be screened prior to the start of a CDE for acceptability. Students caught using data stored on a calculator or communicating with other calculators will result in a total team disqualification for the event.

Any member found cheating in any state-level career development event will result in total team disqualification for that event.

The North Carolina FFA Association, in keeping with the FFA mission and purposes, does not permit the use of tobacco products at any FFA facility or at any FFA activity.

At the North Carolina FFA State Convention, participation in more than one FFA CDE event is permitted as long as events are not being held concurrently and no special provisions are required to facilitate participation with the exception that parliamentary procedure and public speaking and parliamentary procedure and Creed speaking which are held concurrently will allow dual participation and special provisions for flighting.

Dress Code



Participants are required to follow the North Carolina FFA Career Development Event Dress Code. A ten percent reduction in the total team score will be taken if a participant violates the dress code. Participants are allowed to wear long pants, an appropriate shirt with a collar or an appropriate high school or FFA T-shirt.

Procedures for Administering the Event

Part 1: Written Test – Multiple-Choice (100 Points)

The written test will be comprised of a total of 25 multiple-choice items designed to determine each team members understanding of the meat science industry. Sections of the reference to be used for the written test are identified in **Table 1** at the end of this description.

Part 2: Meats Identification (200 points)

Students will identify 20 retail meats cuts found on the *Meats Identification Card (Appendix A)*.

Part 3: Retail Meat Quality (100 Points)

1. Students may receive up to **50 points** by using *Form 2 (Appendix B)* to place four cuts from one of the following classes:
 - a. Pork or Lamb – Loin Chops or Rib Chops
 - b. Beef – T-bone steak or Ribeye steaks
2. In addition, students will take notes on the four cuts in regards to marbling, external fat and amount of bone. Without review, students will answer five questions worth ten points each about the four cuts. This segment is worth a maximum of **50 points**. (See sample questions in **Appendix C**).

Part 4: Meat Formulation Problem Solving (100 Points)

Students will be given a situational problem involving the least cost formulation of a batch of particular meat products (hamburger, wiener, bologna, fresh ground pork, etc.).

Students will use the *Pearson Square (Appendix D)* method to correctly formulate the product and answer 10 questions (value of 10 points each) about the formulation. Questions will be fill in the blank questions. (**Appendix E Meats Formulation Problem Answer Sheet**) Sample problems are provided in **Appendix F and G**.

Scoring

<u>Written Test</u>	<u>100</u>
<u>Retail Cut Identification</u>	<u>200</u>
<u>Retail Quality</u>	<u>100</u>
<u>Meat Formulation Problem</u>	<u>100</u>

Procedure for Determining the State Event Winner When Scores are Tied

In the event a tie score exists, apply the following methods in sequential order until the tie is broken:

1. Compare the total team scores for the retail cut identification and the higher scoring team is the winner.
2. Compare the total team scores for the written test and the higher scoring team is the winner.
3. If these methods fail to break the tie, co-winners will be declared and a run-off event will be held to determine which team will represent North Carolina at the National FFA Convention. The run-off event will follow the same rules as the state event.

Procedure for Determining the State Event High Scorer When Scores are Tied for Individual Participants

In the event a tie score exists, apply the following methods in sequential order until the tie is broken:

1. Compare the individual scores on the retail cut identification and the high scoring individual is the winner.
2. Compare the individual score on the written test and the high scoring individual is the winner.
3. Compare the individual score on the meat formulation problem and the high scoring individual is the winner.



4. If a tie still exists for individuals, co-high scorers will be declared and all tied individuals will be recognized.

State Awards

The awards for the state event will be presented annually at the state FFA convention to include a team 1st, 2nd and 3rd place plaque and a travel monetary award.

National Career Development Event Participation

State winning teams advancing to the national career development event will be automatically registered for the national event. It is the responsibility of the FFA Chapter Advisor to complete all necessary national certification and waiver forms and return them to the State FFA Coordinator by the assigned due date.

State winning CDE teams that choose not to participate at the national level should contact the state office by September 1 prior to National Convention. Teams that fail to inform the state office prior to September 1 will be ineligible to participate in that same CDE for the next year (chapters may appeal to the State FFA Board of Directors). Teams that do not compete at the National Convention will be required to pay back the travel award.

There is one reference for the written test. It is the Meat Science and Food Safety DVD available from CEV Multimedia. Contact information below:

Meat Science and Food Safety DVD
CEV Multimedia
1020 SE Loop 289
Lubbock, TX 79404
Phone: 800.922.9965

There are many other good references that are not required for this event but may be useful to those teams qualifying for the National FFA Meats Evaluation Career Development Event. One such resource is the Meat Identification Tutorial CD-ROM (MID-05) available from the National FFA Organization for \$99.00. The phone number is 1.888.332.2668 or online at <http://www.ffaulimited.org/meevandte.html> for more information.



BI = Bone in; BNLS = Boneless

Table 1							
Units from CEV DVD	Power Point Slides	Total Number	2016	2017	2018	2019	2020
Legislative and History	6-25	19	19		19		19
Animal Care and Handling	26-42	16	16	16	16	16	16
Meat Nutrition	43-57	14		14		14	
Purchasing Meat	58-99	41	41	41	41	41	41
Meat Storage and Handling	100-123	23	23		23		23
Meat Cookery	124-148	24	24		24		24
Processed Meats	149-172	23		23		23	
Food Safety	173-192	19		19		19	
			123	113	123	113	123



Appendix A

North Carolina FFA Association Meats Identification Official Scorecard

Name _____ Chapter _____ Participant No. _____

Beef Cuts

- _____ Beef Brisket
- _____ Beef for Stew
- _____ Beef Short Ribs
- _____ Boneless Round Steak
- _____ Boneless Top Loin Steak (Strip or NY Strip)
- _____ Bottom Round Roast (Rump Roast)
- _____ Bottom Round Steak
- _____ Chuck 7 Bone Pot Roast
- _____ Chuck Roast
- _____ Cubed Steak
- _____ Eye of Round Steak
- _____ Eye Round Roast
- _____ Ground Beef
- _____ Porterhouse Steak
- _____ Ribeye Steak
- _____ Sirloin Steak
- _____ Skirt Steak
- _____ T-Bone Steak
- _____ Tenderloin (Filet Mignon) Steak
- _____ Tip Roast Sirloin
- _____ Top Blade (Flat Iron) Steak
- _____ Top Round Roast
- _____ Top Round Steak

Variety Meats

- _____ Heart
- _____ Kidney
- _____ Tripe
- _____ Liver
- _____ Oxtail
- _____ Tongue

Pork Cuts

- _____ Back Ribs (Baby Back Ribs)
- _____ Boneless Butterfly Chops
- _____ Boneless Shoulder Picnic Roast
- _____ Boneless Smoked Ham
- _____ Center Slice
- _____ Country Style Ribs
- _____ Ground Pork
- _____ Hock (may or may not be cured)
- _____ Tenderloin
- _____ Pork Fat Back
- _____ Pork Shoulder Blade Steak (Pork Butt Steak)
- _____ Pork Shoulder Butt Roast (Boston Butt)
- _____ Sausage (Link or Pattie)
- _____ Sliced Bacon
- _____ Smoked or Fresh Rump Portion
- _____ Smoked or Fresh Shank Portion
- _____ Spareribs
- _____ Smoked Pork Loin Chop
- _____ Smoked Pork Rib Chop
- _____ Smoked Boneless Top Loin Chop
- _____ Top Loin Chop, Boneless

Lamb Cuts

- _____ Loin Chops
- _____ Rib Chops
- _____ Shank Portion
- _____ Leg of Lamb
- _____ Whole Rib Roast -Frenched

Appendix B

JUDGING EVENT PLACING CARD (form 2)

PARTICIPANT NUMBER



NAME
CHAPTER
CLASS NAME

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

Participant Score _____



Appendix C

North Carolina Meat Evaluation Career Development Event

Part III: Retail Meat Quality (100 points)

1. Students will use Form 2 to place four cuts from one of the following classes:

- a. Pork or Lamb – Loin Chops or Rib Chops
- b. Beef – T-bone steaks or Ribeye steaks

The placement activity is worth 50 points if the class is placed perfectly according to the Official's placing.

2. In addition, students will take notes on the four cuts in regards to marbling, external fat, and amount of bone. Without review, students will answer five questions worth ten points each about the four cuts. This segment is worth a maximum of 50 points.

Sample Questions (Steaks)

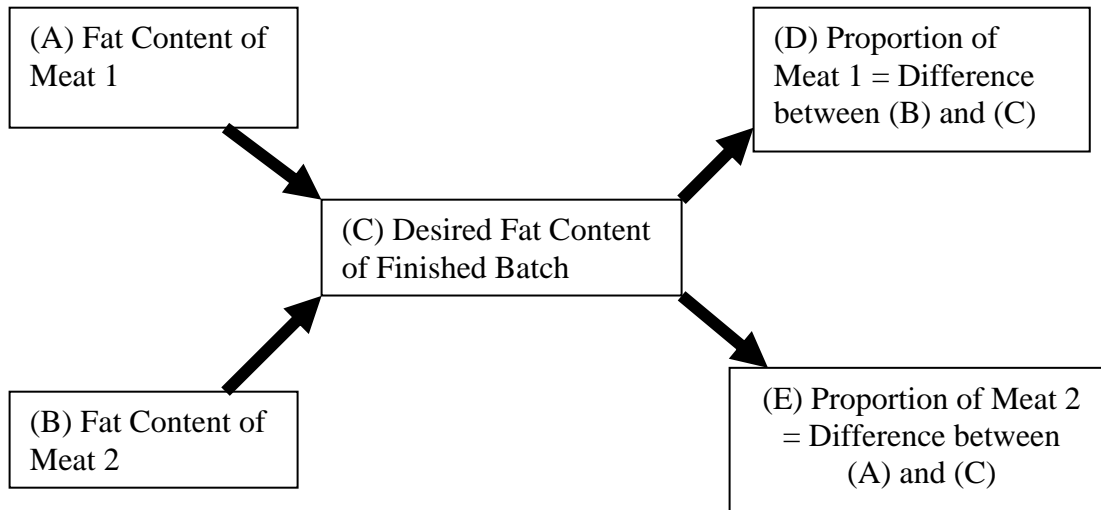
- | | | | | | |
|--|----|----|----|----|---------|
| 1. The chop/steak with the most external fat is: | a. | b. | c. | d. | 10 pts. |
| 2. The chop/steak that has the least bone is: | a. | b. | c. | d. | 10 pts. |
| 3. The chop/steak with the least marbling is: | a. | b. | c. | d. | 10 pts. |
| 4. The chop/steak with the best color is: | a. | b. | c. | d. | 10 pts. |
| 5. The largest of the four chops/steaks is: | a. | b. | c. | d. | 10 pts. |

Questions are worth a total of 50 pts. if all questions are answered correctly.



Appendix D

Pearson Square Calculation



***To check the set up of the Pearson Square:**

The difference in A and B should equal the sum of D and E.

The **PERCENTAGE** of each meat component is determined by dividing the proportion of each component by the total meat components and rounding the answer to four decimal places as seen below.

$$\text{Percentage of Meat 1} = D / (\text{Sum of D} + E) = .xxxx$$

$$\text{Percentage of Meat 2} = E / (\text{Sum of D} + E) = .xxxx$$

$$\text{Pounds of Meat 1 Needed} = \% \text{ of Meat 1} \times \text{Batch Size}$$

$$\text{Pounds of Meat 2 Needed} = \% \text{ of Meat 2} \times \text{Batch Size}$$

$$\text{To Check: Pounds of Meat 1} + \text{Pounds of Meat 2} = \text{Batch Size}$$

To verify Final Fat Content:

$$\begin{aligned} \text{Total lbs. of (Meat 1)} \times (\% \text{fat content}) &= \text{Pounds of Fat from Meat 1} \\ \text{Total lbs. of (Meat 2)} \times (\% \text{fat content}) &= \text{Pounds of Fat from Meat 2} \\ &= \text{Total Pounds of Fat in Batch} \end{aligned}$$

$$\frac{\text{Total Pounds of Fat in Batch}}{\text{Batch Size in Pounds}} = \text{Percentage of Fat in Final Product}$$



Appendix F

North Carolina Meat Evaluation PART IV: MEATS CDE FORMULATION PROBLEM 100 Total Points

SAMPLE PROBLEM 1 AND ANSWER SHEET

Assume Quality Beef Inc. is a meat plant that manufactures ground beef for a chain of retail stores. Quality Beef's mission is to produce a fresh, wholesome product which complies with all meat inspection regulations and which will have three days' shelf life in the meat counter. Each individual retail chain specifies fat content of the ground beef. Quality Beef strives to produce a product at the lowest possible cost to retain financial solvency while complying with federal regulations as well as local store specifications.

USDA Ground Beef Regulations

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, 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 and tongue 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 slaughter.
2. A least-cost determination shall be performed on acceptable meat ingredients to select those meats that produce the lowest cost product that conforms to all ground beef guidelines.
3. To simplify the grinding and blending operation, only two meat ingredients will be used for each batch of ground beef produced.
4. Rounding of decimals: 1 – 4 will be rounded down and 5 – 9 will be rounded up.

Batch Description

Desired Fat Content: 20%

Batch Size: 1,000 lbs.

Meats:

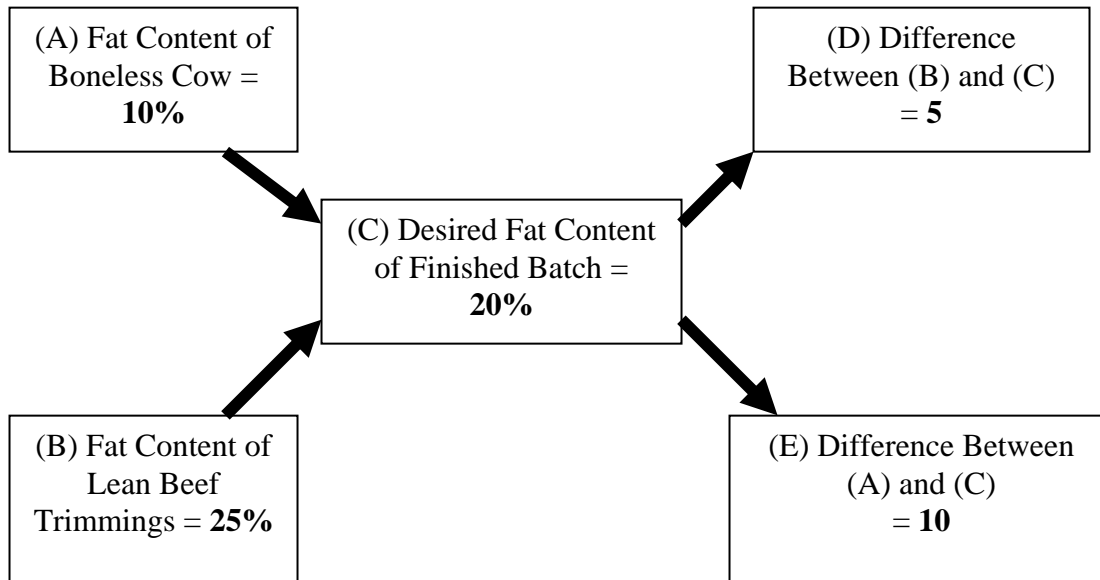
1. Boneless cow meat (10% fat @ \$0.99/lb.)
2. 75% lean beef trimmings (25% fat @ \$0.79/lb.)

Solution to Sample Problem 1



1. The amounts of the two types of meat that must be blended together to give the desired fat content.

Pearson Square Calculation



The difference in A and B = 15 and the sum of D and E = 15 so the Pearson Square is set up properly.

Percentage of Boneless Cow = $5/15 = .3333$ or 33.33%

Percentage of Lean Beef Trimmings = $10/15 = .6667$ or 66.67%

Pounds of Boneless Cow Needed = $33.33\% \times 1,000 \text{ lbs.} = 333.3 \text{ lbs.}$

Pounds of Lean Beef Trimmings = $66.67\% \times 1,000 \text{ lbs.} = 666.7 \text{ lbs.}$

Verify Final Fat Content:

333.3 lbs. of boneless cow x 10% fat content = 33.33 lbs. of fat from boneless cow

666.7 lbs. of beef trimmings x 25% fat content = 166.67 lbs. of fat from beef trim

$33.33 + 166.67 = 200/1000 = 20\%$ fat in final product

2. Questions: These are only sample questions that may or may not be included for the actual problem.



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

Cost per Pound

Boneless cow meat $0.3333 \times \$0.99/\text{lb.} = .33$

75% Beef trim $0.6667 \times \$0.79/\text{lb.} = .53$

\$0.86 lb.

Cost of Final Product = .86 x 1000 = \$860.00

1. What is the cost of the finished product/lb.? **\$.86**
2. What is the total cost for the final batch of ground beef? **\$860.00**
3. How many total pounds of fat from the Boneless Cow Meat needs to be mixed to produce a 1,000 lb. batch of ground beef with 20% fat content? **33 lbs. of boneless cow**
4. What is the desired percentage of fat content of the final product? **20**
5. Which ingredient is **NOT** allowed in ground beef? **Heart**
6. According to USDA standards, what is the highest percentage of fat that ground beef can contain? **30**
7. How many pounds of ground beef will be in the final batch? **1,000**
8. What is the total pounds of the 75% Beef Trim that is needed to mix a 1,000lb batch of ground beef with 20% fat content? **666.7**
9. What is the fat content of the final batch of ground beef? **200 lbs.**
10. What percentage of Boneless cow meat would be used for the proposed batch? **33.33%**



Appendix G SAMPLE PROBLEM 2 AND ANSWER SHEET

Best Beef Company must operate according to the same government regulations that Quality Beef Inc. and other companies follow. However, **Best Beef** also has its own specific requirements. Determine which available ingredients to use (and at what levels) to make the lowest priced ground beef acceptable to the company management.

USDA Ground Beef Regulations

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, 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 and tongue 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 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 of ground beef produced.
4. Rounding of decimals: 1 – 4 will be rounded down and 5 – 9 will be rounded up.

Best Beef Specifications

Desired fat content of finished product is **18%**.

Batch size = **5,000 lbs.**

Manufacturing Date = **February 10**

No product over **five days old may be used.**

No variety meat may be used.

No product over 35°F may be used.

BONELESS MEAT INGREDIENTS AVAILABLE				
Meat Product	Slaughter Date	Temperature	Fat Content	Price
Bull meat	February 6	33°F	8%	\$1.05
Boneless chuck	February 7	35°F	14%	\$1.00
75% lean trim	February 4	32°F	25%	\$0.75
50% lean trim	February 6	31°F	50%	\$0.55
Beef chuck	February 7	37°F	12%	\$0.70
Beef hearts	February 6	32°F	15%	\$0.35

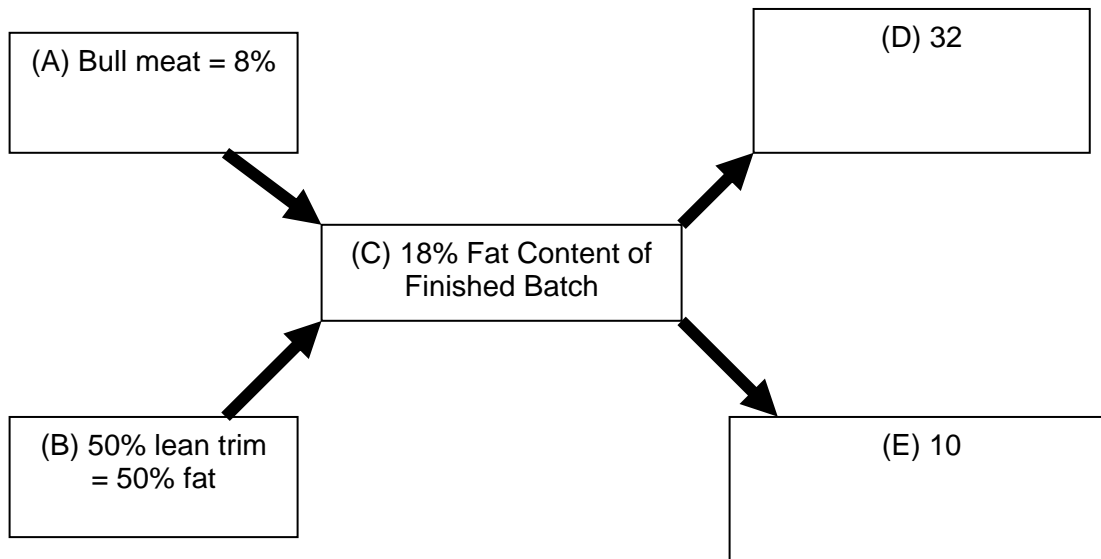


Solution to Sample Problem 2

1. Do all potential ingredients meet government regulations and company specifications?

<i>Acceptable</i>	<i>Non Acceptable</i>
Bull meat	75% lean trim is too old
Boneless chuck	Beef chuck got too warm
50% lean trim	Beef hearts are not allowed

2. Therefore, to produce desired fat content, product could be made from either of the following two combinations: Bull meat and 50% lean trim or Boneless chuck and 50% lean trim
3. Use the Pearson Square method to determine which combination will result in the lowest meat cost.



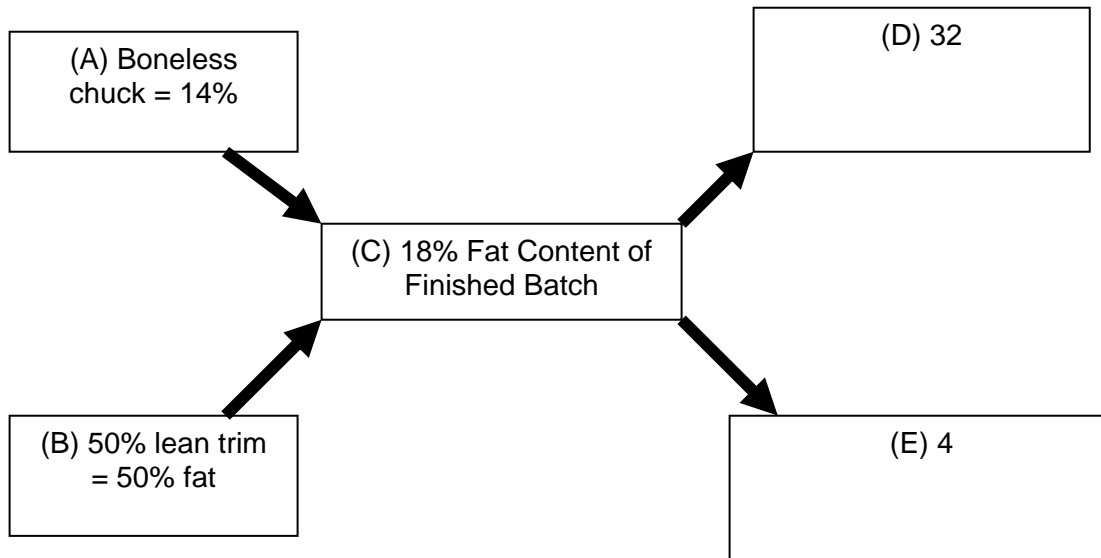
The difference in A and B = 42 and the sum of D and E = 42 so the Pearson Square is set up properly.

Percentage of Bull Meat = $32/42 = .7619 = 76.19\%$
Percentage of Lean Trim = $10/42 = .2381 = 23.81\%$

Pounds of Bull Meat needed = $76.19\% \times 5,000 \text{ lbs.} = 3809.5$
Pounds of 50% lean trim (B) = $23.81\% \times 5,000 \text{ lbs.} = 1190.5$

Verify Final Fat Content
 $3809.5 \text{ lbs. of bull meat} \times 8\% \text{ fat content} = 304.76$
 $1190.5 \text{ lbs. of lean trim} \times 50\% \text{ fat content} = 595.25$

Cost: Bull Meat $0.7619 \times \$1.05 = \$0.799 = \$0.80$
50% trim $0.2381 \times \$0.55 = \underline{\$0.130} = \underline{\$0.13}$
\$0.93 or \$0.93/lb.



The difference in A and B = 36 and the sum of D and E = 36 so the Pearson Square is set up properly.

Percentage of boneless chuck = $32/36 = .8888 = 88.88\%$
 Percentage of Lean Trim = $4/36 = .1111 = 11.11\%$

Pounds of boneless chuck needed = $88.88\% \times 5,000 \text{ pounds} = 4444$
 Pounds of 50% lean trim (B) = $11.11\% \times 5,000 \text{ pounds} = 555.5$

Verify Final Fat Content
 $4444 \text{ lbs. of bull meat} \times 14\% \text{ fat content} = 622.16$
 $555.5 \text{ lbs. of lean trim} \times 50\% \text{ fat content} = 277.75$

Cost: boneless chuck $0.8888 \times \$1.00 = \$0.888 = \$0.89$
50% trim $0.1111 \times \$0.55 = \underline{\$0.061} = \underline{\$0.16}$
 $\$0.95 \text{ or } \$0.95/\text{lb.}$

Final Product: To make the lowest priced ground beef acceptable to the company management.

Meats to be used: Bull Meat3,809.5 lbs.

50% trim1,190.5 lbs.

Cost of final Product\$0.93 lb. or $\$0.93 \times 5,000 = \$ 4650.00$



Questions: These are only sample questions that may or may not be included for the actual problem.

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

1. What amount of bull meat and 50% beef trim needs to be mixed to produce a 5,000 lb. batch of ground beef with 18% fat content?
3809.5 lbs. of bull meat and 1190.5 lbs. of 50% beef trim
2. What amount of boneless chuck and 50% beef trim needs to be mixed to produce a 5,000 lb. batch of ground beef with 18% fat content?
4444 lbs. of boneless chuck and 555.5 lbs. of 50% beef trim
3. How much is saved per pound if bull meat is used instead of boneless chuck?
\$0.02
4. Which ingredient could **NOT** be used because it was kept too warm?
Beef chuck
5. Which ingredient is too old to be used in the ground beef?
75% lean trim
6. Which ingredient does not meet USDA standards to be included in ground beef?
Beef hearts
7. Which ingredient was kept the coldest?
50% lean trim
8. Which ingredient had the greatest percentage of fat?
50% lean trim
9. Which ingredient had the least percentage of fat?
Bull meat
10. How much is the total savings if bull meat is used instead of boneless chuck?
\$100.00