MEAT SCIENCE

UNIVERSITY of NEBRASKA

Youth Meat Judging
FFA & 4-H

Table of Contents

Terminology

Evaluation: "The making of a judgement about the amount, number, or value of something, an assessment"

Trimness (T): The amount and dispersion of fat across an exhibit

Muscling (M): The amount and shape of muscle across an exhibit

Quality (Q): The grouping of characteristics contributing to consumer eating experience and palatability of meat products

Yield Grading (YG): The prediction of percentage closely trimmed retail cuts from an exhibit

Quality Grading (QG): The prediction of consumer eating experience and merchandising value of an exhibit

Youth Meat Judging – Evaluation, Note Taking & Oral Reasons

The purpose of evaluation, note taking, and reasons writing is to take into account the characteristics (Trimness, Muscling, Quality) of each carcass or cut and determine how it compares to the others in the class as well as formulate a set of reasons justifying your decisions.

Developing an effective note taking method and taking accurate notes can result in precise oral reasons or confidence in answering questions. Good notes are those in which are simple, accurate, and detailed enough to "paint a picture" of the class. Furthermore, to increase efficiency in note taking, evaluators should develop a pattern and follow it for every class (systematic, develop routine). There is no one way of taking notes but included is a sample note taking method the University of Nebraska – Lincoln utilizes.

When transition from notes taken to oral reasons, evaluators should ensure all notes and details from their notecard are incorporated into the reasons set. Additionally, evaluators should remain accurate and consistent in their verbiage along with writing legibly, neatly, and with proper grammar (spelling, etc.).

Note Taking:
- A note taking template must be developed (example template below)
  - T: Trimness factors
  - M: Muscling factors
  - Q: Quality factors
  - A: Acknowledgement
  - RL: Reasons Last
  - S: Summary
  - Column on far right is the location in which all class factors are listed

Intercollegiate Meat Judging Contest
Notes for Reasons

Contestant No. _____

Class _____

1st _____ 2nd _____ 3rd _____ 4th _____

T	T	T
M	M	
Q	Q	
T	T	
M	M	
Q	Q	M
T	T	
M	M	
Q	Q	
A	T	
RL	M	Q
S	Q	

- Notes should be clear, well organized, and easy to follow
- Notes should be taken on all carcass and cuts characteristics (Trimness, Muscling, Quality factors)
    - These factors should be memorized (different for each class. i.e. beef carcass characteristics are different than fresh hams characteristics)
    - To increase efficiency, abbreviations for factors can be utilized
- Begin taking notes on you most difficult pair (two exhibits) of a class
    - This allows for evaluators to justify in their mind the placing on the challenging pair early in their time limit. If it is then determined the placing of the pair should be switched, other pair comparisons can then be recorded and the whole class will not have to be re-evaluated and previous notes scratched out.

Filling out Notecard:
- When filling the notecard with notes, each section has specific details (as seen in the figure below).
- The top of the notecard is designed to identify the evaluators name or contestant number, the name of the class being evaluated, and the placing (ranking) of those carcasses or cuts
- At the top of each row is a section to include a "Topic Sentence"
  - A topic sentence is a descriptive phrase to identify why you place one exhibit is ranked over another
- The first three rows of a notecard are designed to contain notes comparing pairs of carcasses or cuts
  - i.e. Placing 1-2-3-4
  - first row of notecard compares 1 over 2. Left box contains positive details for 1 (what 1 did better than 2) and right box contains positive details for 2 (what 2 did better than 1)
  - second row compares 2 over 3
  - third row compares 3 over 4

Intercollegiate Meat Judging Contest
Notes for Reasons

Contest No. **Your Name**

Class **Class Name (i.e. Beef Carcasses)**

Placing

1st _____ 2nd _____ 3rd _____ 4th _____

# / #	**Topic Sentence**	T
T		M
M	**Positive Details**	Q
Q		**Positive Details**

- The last row of the notecard is dedicated for the carcass or cut ranked last
  - Left box identifies Acknowledgement (anything that the last place carcass or cut did well), reasons last (why it ranks last), and summary statement (phrase to conclude notes and reasons set)
  - Right box contains all negative details supporting why it would be ranked last

#		T	
A **Acknowledgement**			
L **Reasons Last**		M **Negative Details**	
S **Summary Statement**		Q	

Topic Sentence:
- A topic sentence is a phase developed to identify why a carcass or cut ranks above another
- A topic sentence is comprised of:
    o Adjective (power)
    o Characteristics (Trimness, Muscling, Quality, or Combination)
    o Cut-Out Statement
- Below is a table to aid in developing a topic sentence

Adjective (Power)	Characteristic	Cut-Out Statement
Advantages	Trimness	. (none)
	Muscling	. (none)
	Quality	. (none)
Greater	Trimness	. (none)
	Muscling	. (none)
	Quality	. (none)
Clearly Greater	Trimness	Higher Lean to Fat Ratio ($\uparrow$ L:F) Higher Percent of Closely Trimmed Retail Cuts ($\uparrow$ %)
	Muscling	Higher Muscle to Bone Ratio ($\uparrow$ M:B) Higher Cut Out Value ($\uparrow$ COV)
	Quality	Higher Merchandising Value ($\uparrow$ MV)
Superior	Trimness	Higher Percent of Closely Trimmed Retail Cuts ($\uparrow$ %)
	Muscling	Higher Muscle to Bone Ratio ($\uparrow$ M:B) Higher Cut Out Value ($\uparrow$ COV)
	Quality	Higher Merchandising Value ($\uparrow$ MV)

- Example topic sentences:
    o I placed # over # due to __Adjective__ __Characteristic__, resulting in a Cut Out Statement.
    o I placed 3 over 4 due to greater muscling.
    o I placed 2 over 1 due to superior trimness resulting in a higher percentage of closely trimmed retail cuts.
    o I placed 4 over 1 due to clearly greater quality, resulting in a higher merchandising value.

Oral Reasons Example (4-H only):

Introduced in 2024, oral reasons mark an exciting addition to the PASE State 4-H Meat Judging Contest. Now, participants in each division (junior, intermediate, and senior) must skillfully present their evaluations and reasoning to judges, adding a dynamic new dimension to the competition.

Please note that the reasons templates and examples provided are merely samples and are open to customization according to your preferences.

Junior Division
Junior division contestant must provide 1 set of oral reasons and will only be asked to vocalize their placing.

Template:
"My name is ____, from (county/team) and I placed this class of (Class Name) (Placing)."

Example:
My name is Bo Garcia from UNL and I placed this class of beef carcasses, 2-4-3-1.

Intermediate Division
Intermediate division contestants must provide 1 set of oral reasons and can utilize their notes if needed.

Template:
"My name is ____, from (county/team) and I placed this class of (Class Name) (Placing). In my top pair I placed (#) over (#) as it was (Reasoning) as shown by (Examples). In my middle pair, I placed (#) over (#) as it was (Reasoning) as shown by (Examples). And finally, in my bottom pair, I placed (#) over (#) as it was (reasoning) as shown by (Examples). Therefore, resulting in (#) being placed last. In all, I placed this class of (Class Name) (Placing). Thank you.

Example:
My name is Bo Garcia from UNL and I placed this class of beef carcasses, 2-4-3-1. In my top pair I placed 2 over 4 as it was higher quality as shown by a higher degree of marbling in a brighter cherry red ribeye. In my middle pair, I placed 4 over 3 as it was trimmer as shown by less fat opposite the ribeye, over the round,

over the rib, and over the chuck. And finally, in my bottom pair, I placed 3 over 1 as it was higher quality as shown by a higher degree of marbling in the ribeye. Therefore, resulting in beef carcass number 1 being placed last. In all, I placed this beef carcass class 2-4-3-1. Thank you.

Senior Division
Senior division contestants must provide 2 sets of oral reasons. Note utilization is not recommended.

Template:
"My name is _____, from (county/team) and I placed this class of (Class Name) (Placing). In my top pair I placed (#) over (#) as it was (Reasoning) as shown by (Examples). In my middle pair, I placed (#) over (#) as it was (Reasoning) as shown by (Examples). And finally, in my bottom pair, I placed (#) over (#) as it was (reasoning) as shown by (Examples). Therefore, resulting in (#) being placed last. In all, I placed this class of (Class Name) (Placing). Thank you.

Example:
My name is Bo Garcia from UNL and I placed this class of Lamb Loin Chops, 4-3-2-1. In my top pair I placed 4 over 3 as it was trimmer as shown by less external fat. In my middle pair, I placed 3 over 2 as it was heavier muscled as shown by a larger longissimus dorsi and psoas major. And finally, in my bottom pair, I placed 2 over 1 as it contained less waste as shown by less bone waste. Therefore, resulting in Lamb Loin Chop number 1 being placed last. In all, I placed this Lamb Loin Chops 4-3-2-1. Thank you.

Reasons Set Vocabulary:
- As a reason set is developed, certain verbiage can aid in emphasizing phrases and being more descriptive
- Incorporate the list of words into reasons sets (Not all words should be used)

Verbs	**Power Words**
as shown by	easily
as displayed by	without hesitation
as evidenced by	significantly
exhibited	substantially
had	undoubtedly
manifested (marbling only)	unquestionably
presented	immediately
possessed	readily
expressed	especially
	clearly
Transition Words	
Additionally,	
Also,	**Last Paragraph Words**
Plus,	Lastly
Moreover,	Therefore
In addition,	I acknowledge
	absolute
Grant Statements	fattest
I admit,	wastiest
I concede,	lowest yielding
I realize,	lowest quality
I grant,	lightest muscled
I recognize,	thus placed last
	lowest (insert opposite of cut-out statement)

Youth Meat Judging – Pork Evaluation

Pork carcasses (in-tact / un-ribbed) are evaluated and ranked solely on their predicted percent saleable product. Percent saleable product (a.k.a. cutability OR percentage closely trimmed retail cuts) is impacted by both trimness and muscling. Trimness refers to the amount and dispersion of fat while muscling refers to the amount and shape of muscle on the carcass or cut. Specific to carcasses, the confirmation (length in relation to width and outline) is a way to evaluate muscling. The muscling of a pork carcass can rank on a scale of 1 – 3 (1: thin, 3: thick). Carcasses with a muscle score of 1 are extremely light muscled (inferior), muscle scores of a 2 are considered average, and carcasses with a muscle score of 3 are very heavy muscled, as seen in the picture below.
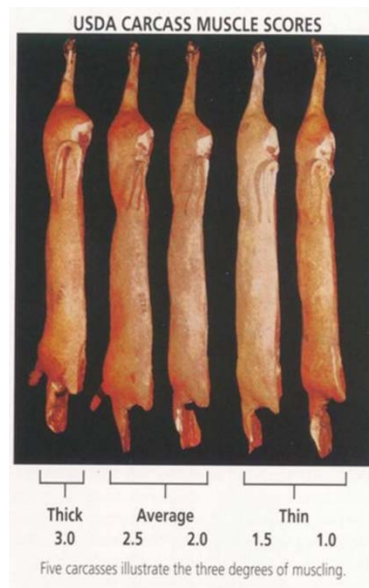

Pork Muscling Scores. (AMSA, 2001)

Pork carcasses that are ribbed (between the 10th and 11th ribs) and all pork cuts are assessed for quality acceptability prior to evaluating their cutability. Pork quality is evaluated at the ribbed or product cut surface(s) (rib interface in pork carcasses, buttface in fresh hams, and blade and sirloin faces in loins). Acceptable pork quality is described as Red, Firm, and Non-exudative (RFN). UNacceptable pork quality is described as Pale, Soft, and Exudative (PSE) or Dark, Firm, and Dry (DFD). If PSE, the product will appear pale in color, soft in texture, and exudative (loose water on surface of lean / pooling water on table). Pork that is DFD will appear dark in color, firm in texture, and dry (appears dry at the cut surface). If quality is deemed UNacceptable, that exhibit must be ranked last.

Pork Carcasses:
- Pork carcasses predicted to result in the highest percent saleable product should rank first
- Evaluate and rank carcasses on observed trimness differences
- If carcasses are deemed comparable in trimness, muscling differences become priority when ranking
- Carcasses with inferior muscling (muscle score 1) will rank last
- Evaluate and take notes on the following characteristics:

Trimness	Muscling	Quality
- Opposite the loineye (ribbed cx) - Clear plate - First rib - Center loin - Last rib - Lumbar region - Last lumbar vertebrae - Collar - Belly pocket - Navel edge - Sternum - Leaf fat - Jowl	- Loineye (ribbed cx) - Ham - Sirloin - Loin - Shoulder - Lumbar lean	- Marbling (ribbed cx) - Color (ribbed cx) - Feathering (in between first three ribs) - Fat streakings (in the lumbar lean) - Lumbar lean color - Belly lean color
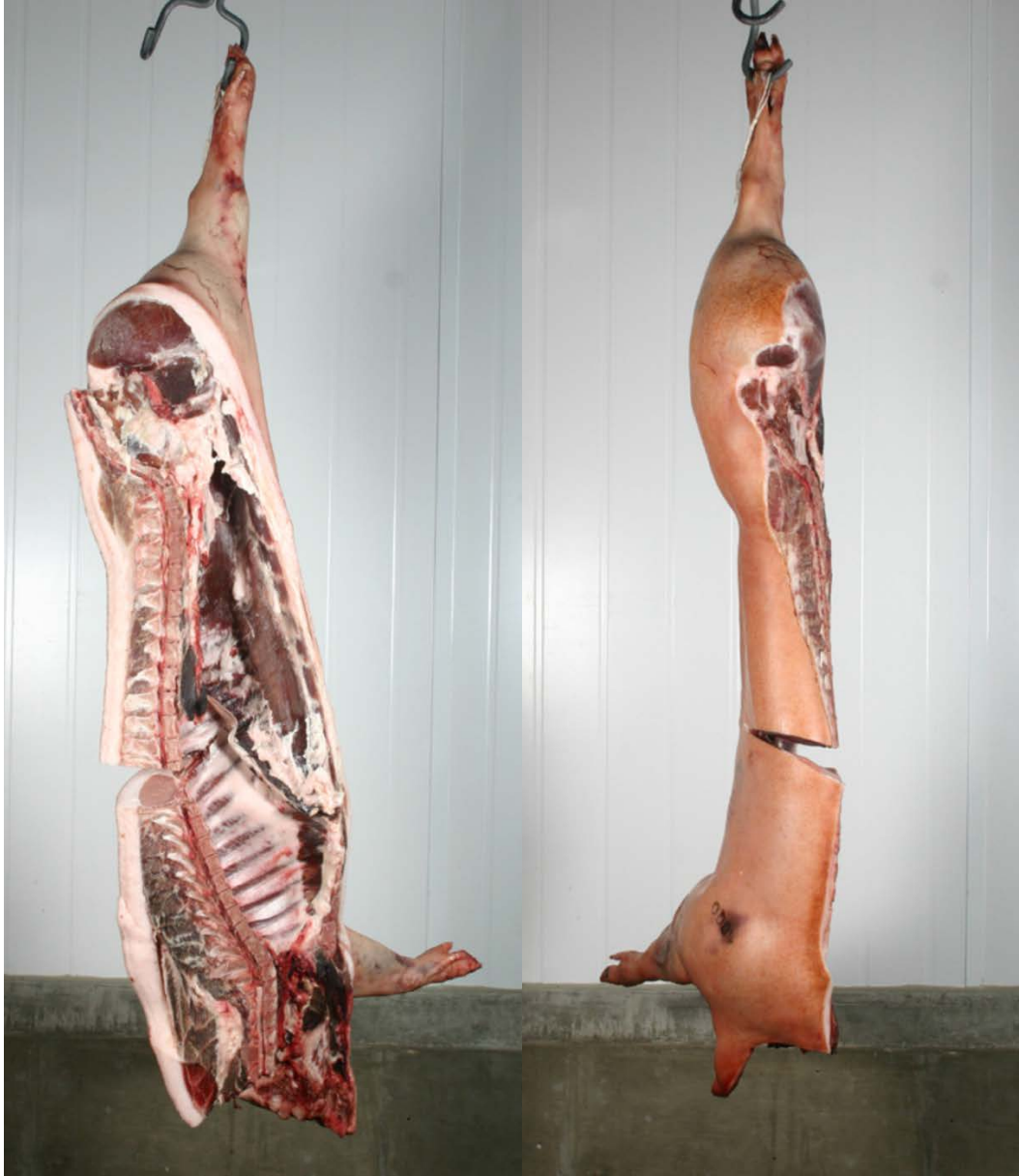
Fresh Hams:
- Evaluate and rank fresh hams after quality is deemed ACCEPTABLE (no PSE or DFD). Hams of unacceptable quality will rank last
- Hams predicted to result in the highest percent saleable product should rank first
- Evaluate and rank hams on observed trimness differences
- If hams are deemed comparable in trimness, muscling differences become priority when ranking
- Evaluate and take notes on the following characteristics:

Trimness	Muscling	Quality
• Beneath the buttface • Alongside the buttface • Over the forecushion • Collar • Seam fat	• Buttface – Forecushion • Center section • Cushion • Heel – Shank	• Color (buttface) • Firmness • Texture • Marbling • Exudation • Muscle separation
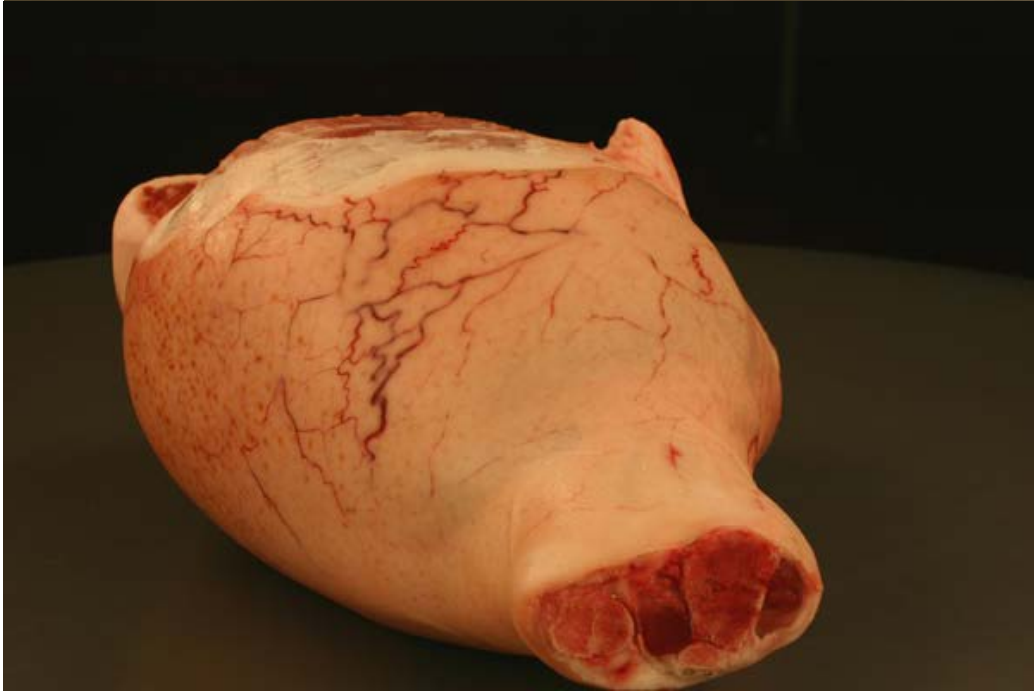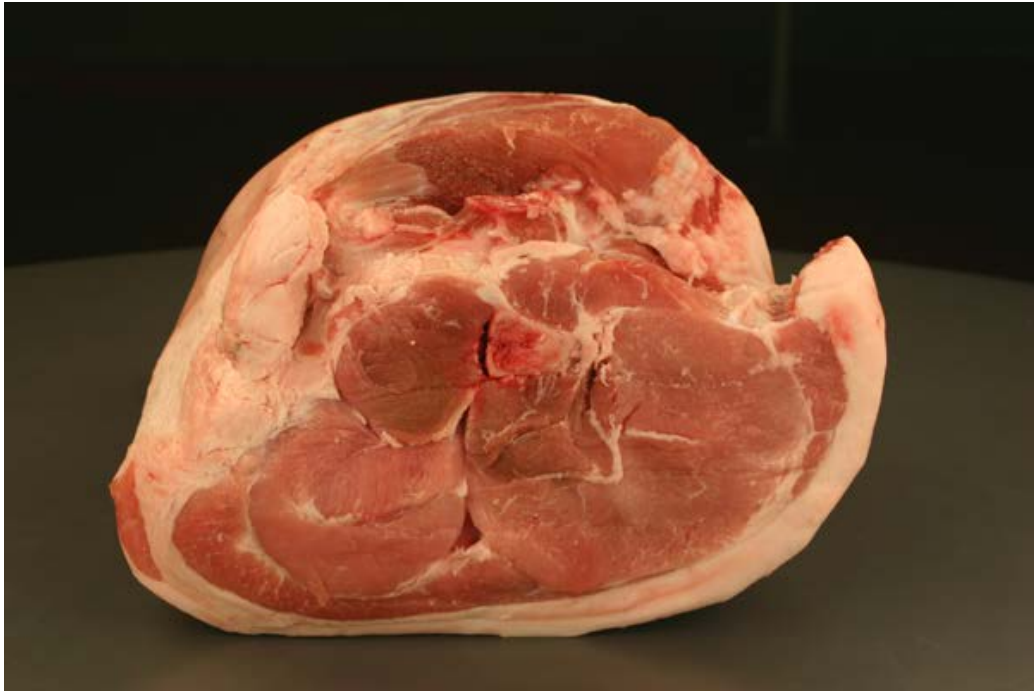
Pork Loins:

- Evaluate and rank pork loins hams after quality is deemed ACCEPTABLE (no PSE). Loins of unacceptable quality will rank last
- Loins predicted to result in the highest percent saleable product should rank first
- Evaluate and rank loins on observed trimness differences
- If loins are deemed comparable in trimness, muscling differences become priority when ranking
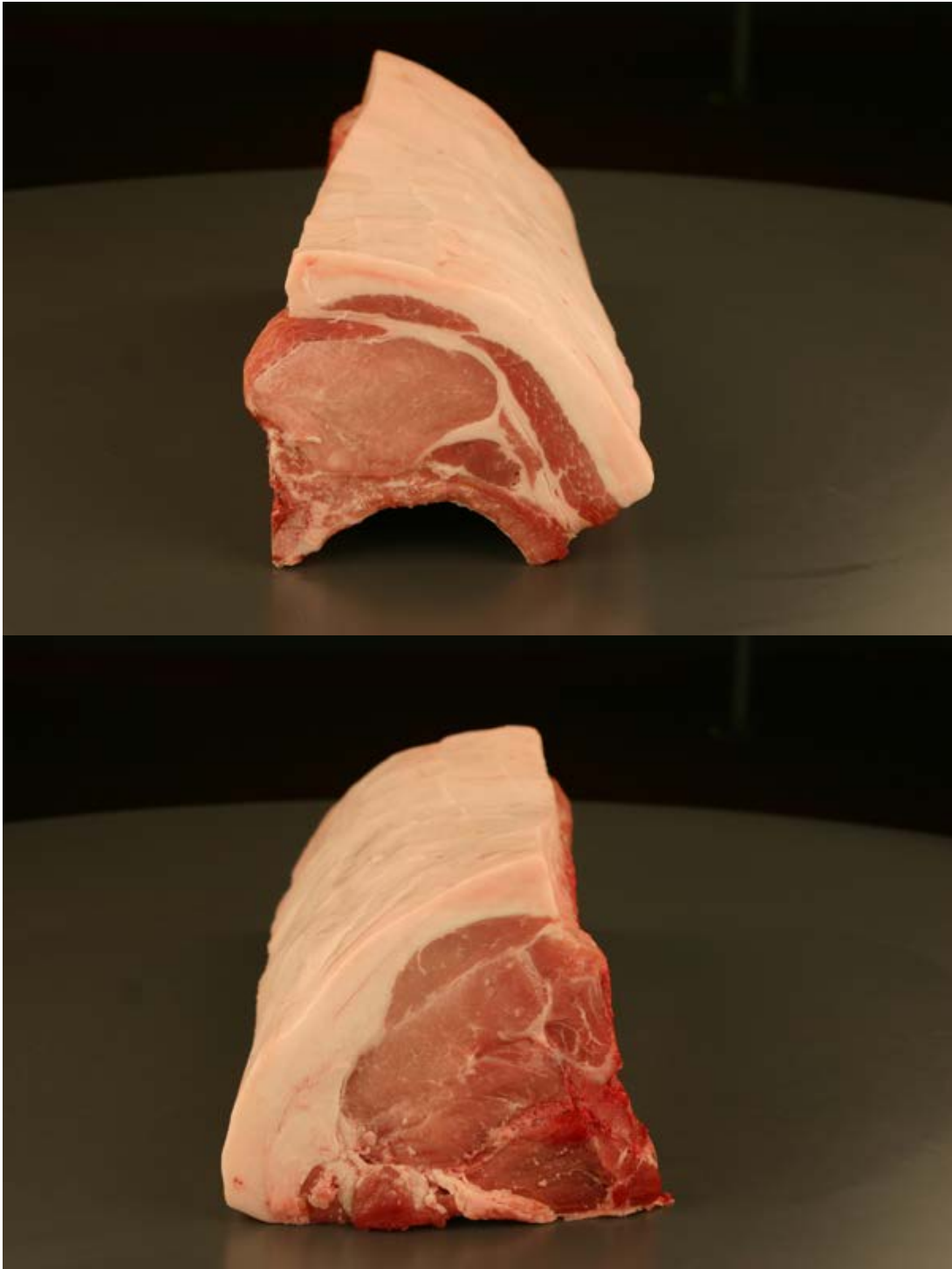- Evaluate and take notes on the following characteristics:

Trimness	Muscling	Quality
• Blade face • Lower rib • Seam fat (blade face) • Back • Sirloin face • Seam fat (sirloin face) • Kidney fat	• Blade face – loineye, secondary muscles • Back • Sirloin face – longissimus dorsi, gluteus medius, psoas major	• Color • Firmness • Texture • Marbling • Exudation

Youth Meat Judging – Beef Quality Grading

Beef quality grades and quality grading is a way in predicting the overall palatability and predicted consumer eating experience of beef products. To assign a quality grade, degree of marbling and overall carcass maturity must be determined. Marbling refers to the amount of intramuscular fat within the exposed surface of the longissimus dorsi (ribeye) muscle. Carcass maturity refers to the predicted age (chronological age) of that beef animal prior to harvest. To assess carcass maturity, the skeletal system (physiological age) is evaluated for the amount of ossification (process of cartilage changing to bone).

Marbling Scores / Degree of Marbling:
- A total of 9 different marbling scores can be assigned (listed from most amount to least amount)
    - Abundant – Ab
    - Moderately Abundant – Mab
    - Slightly Abundant – Slab
    - Moderate – Md
    - Modest – Mt
    - Small – Sm
    - Slight – Sl
    - Traces – Tr
    - Practically Devoid – Pd
- Once marbling score is determined, a degree on a scale of 0 – 100 can be assigned (e.g. Mab^{50}, Sm^{20}, Tr^{80}; the superscript number indicates that the marbling is 80% across the range within Traces marbling)
- A timeline approach can aid in visualizing amount of marbling
  Pd^{00} ----- Tr^{00} ----- Sl^{00} ----- Sm^{00} ----- Mt^{00} ----- Md^{00} ----- $Slab^{00}$ ----- Mab^{00}
- USDA marbling score cards are a useful reference when assigning marbling scores

Carcass Maturity:
- Overall carcass maturity is assigned once skeletal and lean maturities are determined
- Overall carcass maturity is recorded as one of five maturity groups (A, B, C, D, or E; A: Youthful; E: Mature)
- A timeline approach can aid in visualizing maturity

A^{00} ------------ B^{00} ------------ C^{00} ------------ D^{00} ------------ E^{00} ------------ E^{100}

Skeletal Maturity:
- Skeletal maturity is recorded as one of five maturity groups A, B, C, D, or E (associated with an approximate chronological age, months). A & B maturity are considered youthful while C, D, & E are considered advanced skeletal maturity
  - A: 9 – 30; youthful
  - B: 30 – 42
  - C: 42 – 72
  - D: 72 – 96
  - E: >96; Mature
- Carcass skeletal maturity is evaluated just anterior to the 12th – 13th rib interface at the first three full thoracic buttons (as seen in figure below)
  - Take estimated percentages of visible ossification (cartilage changing to bone) of first three full thoracic buttons and divide by three for average percent ossification. Practice averaging ossification with the table below. Record on a scale of A – E
  - A: 0 – 10% ossification
  - B: 10 – 35%
  - C: 35 – 70%
  - D: 70 – 90%
  - E: >90% ossification
- Once ratio of cartilage to bone is determined and a maturity group is assigned, a degree on a scale of 0 – 100 can be assigned (e.g. A^{40}; the superscript number indicates that the maturity is 40% across the range within A maturity)
- A timeline approach can aid in visualizing maturity

A^{00} ------------ B^{00} ------------ C^{00} ------------ D^{00} ------------ E^{00} ------------ E^{100}

#	1st Button	2nd Button	3rd Button	Avg. Ossification % / A – E
1	0	0	0	
2	0	8	20	
3	5	5	5	
4	5	30	40	
5	25	35	55	
6	15	45	75	
7	10	10	5	
8	10	35	75	
9	25	80	95	
10	45	65	85	

Lean Maturity:
- Lean maturity is recorded as one of five maturity groups (A, B, C, D, or E) (as compared with figure below).
- Once lean maturity is evaluated and a maturity group is assigned, a degree on a scale of 0 – 100 can be assigned (e.g. A^{40}; the superscript number indicates that the maturity is 40% across the range within A maturity)
- A timeline approach can aid in visualizing maturity

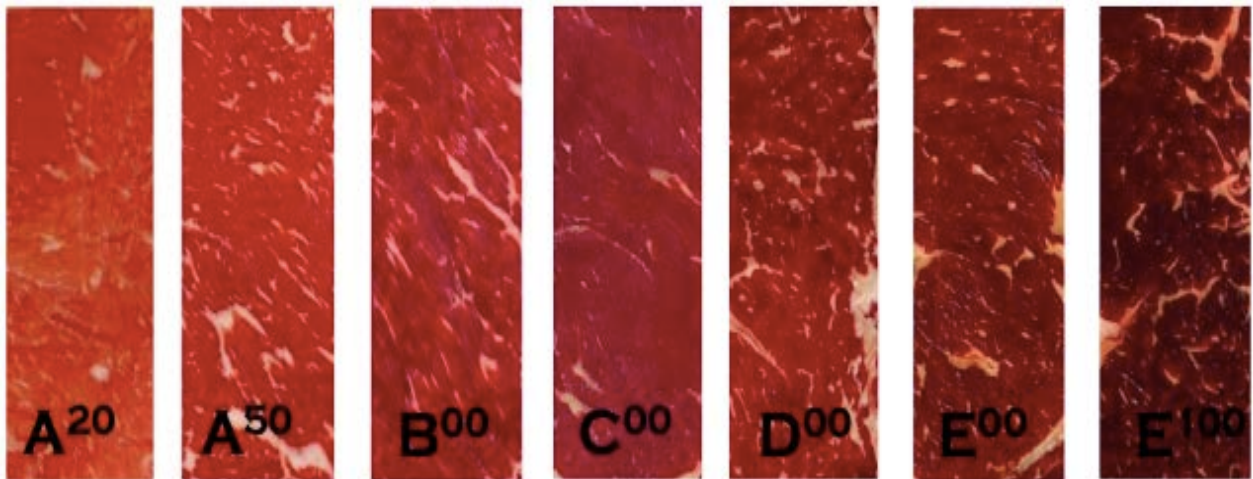 A^{00} ------------ B^{00} ------------ C^{00} ------------ D^{00} ------------ E^{00} ------------ E^{100}

Lean maturity. (USDA, 2020)

Composite of Skeletal & Lean Maturites:
- To determine overall carcass maturity, both the skeletal and lean maturities of that carcass are taken into account
- To calculate overall carcass maturity, skeletal and lean maturities must be assigned to one of five maturity groups (letter and degree pertaining to each: e.g. skeletal: A^{80}, lean: A^{70})
- A timeline approach can aid in visualizing and calculating overall maturity
  A^{00} ------------ B^{00} ------------ C^{00} ------------ D^{00} ------------ E^{00} ------------ E^{100}
- Rules to follow when assigning overall carcass maturity
  - Skeletal (S) and lean (L) maturities are within 40 degrees difference (i.e. S:A^{50} & L:A^{90}), simply average them (e.g. S:A^{50} & L:A^{90}, A^{70} overall maturity)
  - Skeletal and lean maturities more than 40 degrees difference (i.e. S:B^{20} & L:A^{40}), average them and move 10 degrees toward skeletal (e.g. S:B^{20} & L:A^{40}, Avg.: A^{80} + 10 degrees toward skeletal = A^{90} overall maturity)
  - Overall maturity cannot be more than 100 degrees from skeletal maturity (e.g. S:E^{50} & L:B^{50}, D^{50} overall maturity)
  - If advanced skeletal maturity is observed (C – E), the overall maturity cannot result in A or B, must remain advanced (C – E). B / C line cannot be crossed (e.g. S:C^{50} & L:A^{70}, C^{00} overall maturity)
- Practice calculating overall carcass maturity with the table below

#	Skeletal Maturity	Lean Maturity	Overall Maturity
1	A^{50}	A^{80}	
2	A^{50}	A^{90}	
3	A^{80}	B^{20}	
4	B^{50}	A^{90}	
5	C^{50}	E^{50}	
6	C^{50}	A^{60}	
7	E^{00}	B^{20}	
8	C^{60}	A^{80}	
9	D^{50}	B^{50}	
10	E^{100}	B^{40}	

Youth Quality Grading Rules (accounting for dentitional maturity):
- Carcasses that show indication of advanced dentitional maturity will be Tagged as over 30 months of age ("30+" or ">30 mo"). If no tag indicating over 30 months of age is present, they are consider Untagged. Skeletal maturity is evaluated for ALL carcasses, both Tagged and Untagged
- Rules for Tagged carcasses (30+ / >30 mo)
  - Eligible for all maturities (A – E)
  - B/C line cannot be crossed
  - Calculate overall maturity as described above
- Rules for Untagged carcasses
  - Carcasses with skeletal maturities of A, B, or C (C^{100}/D^{00} maturity or less) are deemed as A maturity overall
  - Carcasses with D or E skeletal maturity are considered "Old Bone"
  - When combined with a youthful lean maturity (A or B), D skeletal maturity can result in C overall maturity and E skeletal maturity can result in D overall maturity (e.g. S:D^{50} & L:B^{50}, C^{50} overall maturity)
- Practice calculating overall carcass maturity with the table below

#	Skeletal Maturity	Lean Maturity	Overall Maturity
1	A^{90}	A^{70}	
2: "30+"	A^{50}	A^{90}	
3	A^{80}	B^{20}	
4: "30+"	B^{50}	A^{90}	
5	C^{50}	E^{50}	
6: "30+"	C^{50}	A^{60}	
7: "30+"	E^{00}	B^{20}	
8	C^{60}	A^{80}	
9: "30+"	D^{50}	B^{50}	
10: "30+"	E^{100}	B^{40}	

Overall Quality Grade:

- Overall quality grade can be assigned once marbling and overall carcass maturity are determined
- A total of 8 different quality grades can be assigned
  - Prime
  - Choice
  - Select
  - Standard
  - Commercial
  - Utility
  - Cutter
  - Canner
- Assign overall quality grade utilizing charts below
- Practice calculating overall quality grade with the table below

#	Overall Maturity	Marbling Score	Overall Quality Grade
1	A^{80}	Mab^{40}	
2	B^{50}	Sm^{10}	
3	C^{40}	Mt^{30}	
4	D^{50}	$Slab^{70}$	
5	E^{40}	Sm^{80}	
6	A^{50}	Sl^{30}	
7	A^{40}	Sm^{20}	
8	A^{60}	Md^{20}	
9	D^{30}	Tr^{80}	
10	B^{70}	Md^{20}	

Relationship Between Marbling, Maturity, and Carcass Quality Grade*

Maturity**

Degrees of Marbling	A***	B	C	D	E	Degrees of Marbling
Abundant						Abundant
Moderately Abundant	Prime					Moderately Abundant
Slightly Abundant						Slightly Abundant
Moderate			Commercial			Moderate
Modest	Choice					Modest
Small						Small
Slight	Select			Utility		Slight
Traces					Cutter	Traces
Practically Devoid	Standard					Practically Devoid

* Assumes that firmness of lean is comparably developed with the degree of marbling and that the carcass is not a "dark cutter."
** Maturity increases from left to right (A through E).

USDA (1997) Standards for Grades of Slaughter Cattle and Standards for Grades of Carcass Beef.

	A	B		C	D	E
Slab	Pr⁻		Ch⁺	Commercial⁺	Md	Slab	Mab
Md	Ch⁺		Ch°	Commercial°	Mt	Md	Slab
Mt	Ch°		Ch⁻	Commercial⁻	Sm	Mt	Md
Sm	Ch⁻			Utility⁺	Sl	Sm	Mt
Sl	Sel⁺ (50-100) / Sel⁻ (0-40)			Utility°	Tr	Sl	Sm
Tr	St			Utility⁻		Tr	Sl
Pd							

Youth Meat Judging – Beef Yield Grading Method 1

Beef yield grades and yield grading is a way in predicting the percent saleable product derived from the four lean cuts of a beef carcasses (round, loin, rib, and chuck). To calculate and assign a final yield grade (FYG), backfat thickness (PYG), ribeye area (REA), kidney pelvic, heart fat percentage (KPH), and carcass weight (HCW) must be accounted for.

Beef yield grades range numerically from 1.0 to 5.9. Beef carcasses classified as yield grade 1 (1.0 – 1.9) will result in the highest degree of cutability, while carcasses classified as yield grade 5 (5.0 – 5.9) have the lowest cutability. Even while yield grades can be calculated to the tenths place, large-scale meat packing facilities report and stamp yield grade as a whole number (i.e. 1, 2, 3, 4, or 5).
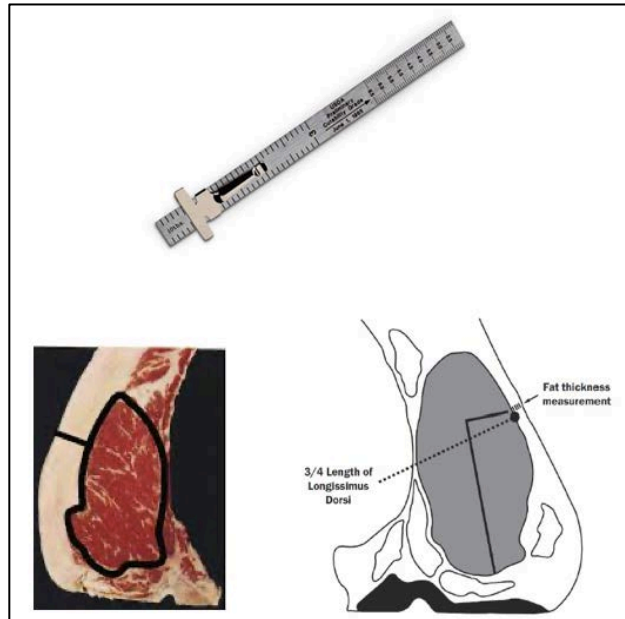
Yield Grades 1 – 5, respectively:
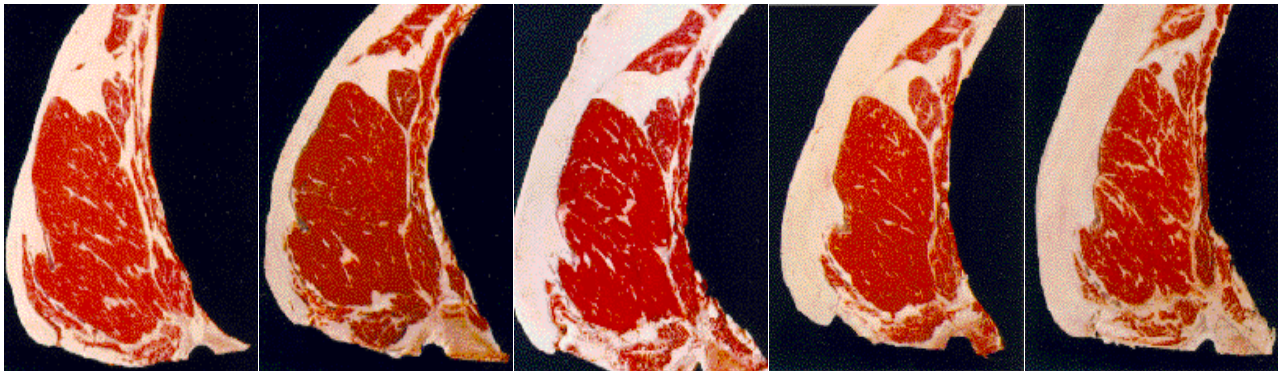
Notice as yield grades numerically increase (left to right, 1 – 5), amount of external fat (PYG) increases and often times ribeye area (REA) decreases.

Preliminary Yield Grade (PYG) / Backfat Thickness:
- Measured with a USDA Preliminary Yield Grade Ruler
  - Ruler has two measurement sides, inches and Preliminary Yield Grade. Preliminary Yield Grade side will be utilized for calculation purposes
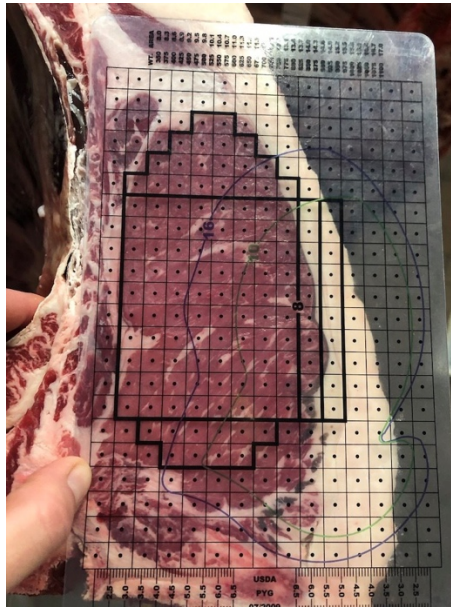- Measured 75% (¾) the way up (the length of) the ribeye (as seen by black line in image below)

Beef Grading. (Texas A&M AgriLife, 2021. Troxel & Gadberry, 2015. Tatum, 2021)

PYG Adjustments:
- Adjustments to initial PYG are made to account for variation in backfat thickness across the carcass (visual assessment)
- Adjustments can be made "up" or "down" depending on how external fat varies from PYG
- To make an adjustment, areas of carcass that are assessed for external fat include:
  - Lower rib (emphasis here)
  - Round
  - Sirloin
  - Loinedge (emphasis here)
  - Rib
  - Chuck
- Limit adjustments to +/- .3 from initial PYG
  - e.g. Initial PYG: 2.5, can adjust up to 2.8, can adjust down to 2.2

Ribeye Area (REA):
- Measured with a USDA Ribeye Dot Grid (every 10 dots = 1 sq. inch)

Hot Carcass Weight (HCW):
- HCW will be provided on the carcass tag and will not have to be visually assessed
- Each carcass weight has an associated ribeye size (a.k.a. "Needs")
  - Memorize chart of carcass weights and associated ribeye size

Pounds	Carcass Weight					
	600	**700**	**800**	**900**	**1000**	**1100**
0	11	12.2	13.4	14.6	15.8	17
8	11.1	12.3	13.5	14.7	15.9	17.1
16	11.2	12.4	13.6	14.8	16	17.2
25	11.3	12.5	13.7	14.9	16.1	17.3
33	11.4	12.6	13.8	15	16.2	17.4
41	11.5	12.7	13.9	15.1	16.3	17.5
50	11.6	12.8	14	15.2	16.4	17.6
58	11.7	12.9	14.1	15.3	16.5	17.7
66	11.8	13	14.2	15.4	16.6	17.8
75	11.9	13.1	14.3	15.5	16.7	17.9
83	12	13.2	14.4	15.6	16.8	18
91	12.1	13.3	14.5	15.7	16.9	18.1

Cx Wt – "Needs"	Cx Wt – "Needs"	Cx Wt – "Needs"	Cx Wt – "Needs"	Cx Wt – "Needs"	Cx Wt – "Needs"
600 – 11.0	700 – 12.2	800 – 13.4	900 – 14.6	1000 – 15.8	1100 – 17.0
625 – 11.3	725 – 12.5	825 – 13.7	925 – 14.9	1025 – 16.1	1125 – 17.3
650 – 11.6	750 – 12.8	850 – 14.0	950 – 15.2	1050 – 16.4	1150 – 17.6
675 – 11.9	775 – 13.1	875 – 14.3	975 – 15.5	1075 – 16.7	1175 – 17.9

- o Simplified version of carcass weights and associated ribeye size

- Visually measure the ribeye size in square inches (in^2) and record on your yield grading sheet
- Once the "Needs" and "Has" ribeye sizes have been determined/evaluated, record on your yield grading sheet
- If a carcass has (a.k.a. "Has") a ribeye size larger than its Needs, a minus adjustment (-) will be made to the PYG
- If a carcass has a ribeye size less than its Needs, an addition adjustment (+) will be made to the PYG
 - o To understand how to mathematically adjust for ribeye size, memorize REA adjustment chart

REA	Adjustment to PYG
0.0 – 0.1	0.0
0.2 – 0.4	0.1
0.5 – 0.8	0.2
0.9 – 1.0	0.3

- To understand the impact REA has on final yield grade (adjustments to PYG) practice calculating REA adjustments with the table below

Cx Weight		Needs	Has		Difference	REA Adj.		Adjustment to PYG
725	→		- 12.2	=		→	=	
950	→		- 15.9	=		→	=	
672	→		- 11.4	=		→	=	
899	→		- 15.7	=		→	=	

Kidney, Pelvic, and Heart Fat (KPH):
- KPH is the fat inside the body cavity that once surrounded the intestines (pelvic cavity), kidneys, and heart (highlighted in figure below)
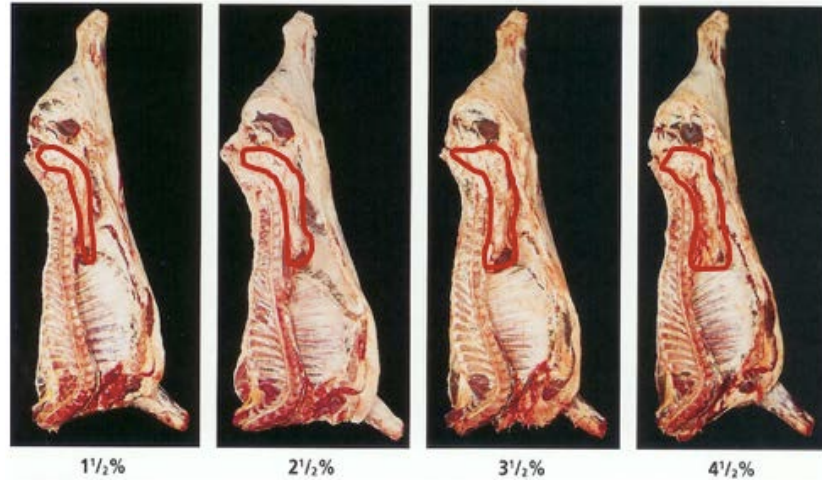
KPH percentage. (AMSA, 2001)

- KPH is visually assessed and reported as a percentage in relation to the carcass weight
- Because large-scale beef processing facilities remove KPH during the harvest process, there should be minimal KPH left when carcasses are evaluated
    - o For this reason, KPH will be provided (as a %) on the carcass tag
- To understand the impact KPH has on final yield grade (adjustments to PYG), memorize the table below

KPH %	Adjustment
4.5	+ .2
4.0	+ .1
3.5	---
3.0	- .1
2.5	- .2
2.0	- .3
1.5	- .4
1.0	- .5

Final Yield Grade (FYG):
- FYG can be calculated once PYG (& PYG adjustment if needed), REA, KPH, and HCW are determined & recorded
- FYG will be calculated and recorded to the nearest tenth (i.e. 1.9, 5.3, 3.5) on a scale from 1.0 – 5.9
- FYGs calculated to be <1.0 will be reported as 1.0 (i.e. FYG 0.7, reported as 1.0)
- FYGs calculated to be >5.9 will be reported as 5.9 (i.e. FYG 6.3, reported as 5.9)
- Example FYG calculations below

PYG / Adj.	REA	HCW (REA Adj.)	KPH	FYG
2.5 / 2.7	N: 14.9 H: 16.2	927 (- 1.1)	2.0 (- .3)	1.3
3.7 / ---	N: 14.0 H: 14.7	850 (- .2)	2.5 (- .2)	3.3
4.3 / 4.6	N: 13.2 H: 14.2	790 (-1.0)	3.0 (- .1)	3.5
5.8 / 5.9	N: 13.2 H: 12.5	789 (+ .2)	4.0 (+ .1)	5.9 (6.2)

- To understand the impact PYG, REA, KPH, and HCW have on final yield grade practice calculating FYG in the table below

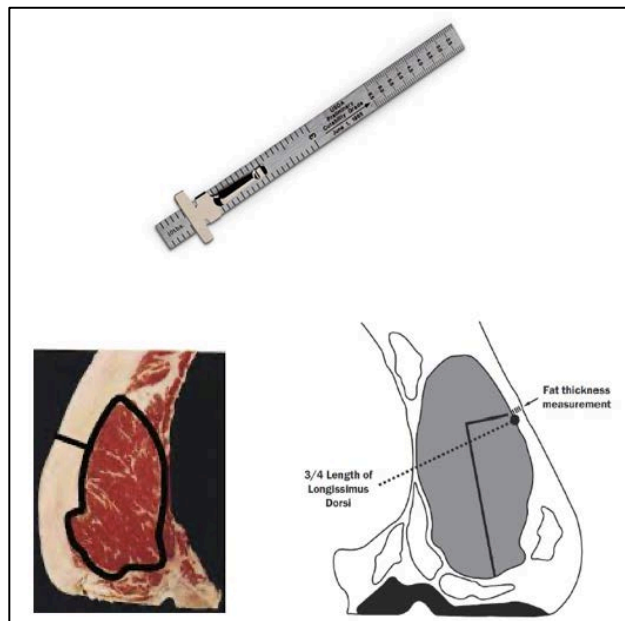| PYG / Adj.	REA	HCW	KPH	FYG
2.5 / 2.6	N: H: 16.1	935	1.5	
4.1 / ---	N: H: 13.5	781	3.0	
5.2 / 5.3	N: H: 12.9	801	4.0	
3.2 / ---	N: H: 14.8	985	2.0	
2.5 / ---	N: H: 18.6	1001	1.0	
5.7 / 5.9	N: H: 10.8	698	4.5	
4.5 / 4.8	N: H: 13.5	850	3.5	

Youth Meat Judging – Beef Yield Grading Method 2

As previously noted, beef yield grades and yield grading is a way in predicting the percent saleable product derived from the four lean cuts of a beef carcasses (round, loin, rib, and chuck). To calculate and assign a final yield grade (FYG), backfat thickness (PYG), ribeye area (REA), kidney pelvic, heart fat percentage (KPH), and carcass weight (HCW) must be accounted for.

Below is another method for determining beef yield grades. Both methods are effective and determining which to utilize is dependent on student, coach, and advisor preference.

Preliminary Yield Grade (PYG) / Backfat Thickness:
- Measured with a USDA Preliminary Yield Grade Ruler
    - Ruler has two measurement sides, inches and Preliminary Yield Grade. Preliminary Yield Grade side will be utilized for calculation purposes
- Measured 75% (¾) the way up (the length of) the ribeye (as seen by black line in image below)
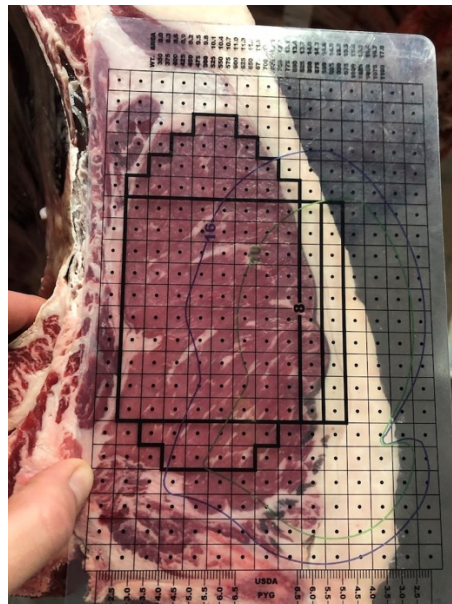

Beef Grading. (Texas A&M AgriLife, 2021. Troxel & Gadberry, 2015. Tatum, 2021)

PYG Adjustments:
- Adjustments to initial PYG are made to account for variation in backfat thickness across the carcass (visual assessment)
- Adjustments can be made "up" or "down" depending on how external fat varies from PYG
- To make an adjustment, areas of carcass that are assessed for external fat include:
  - Lower rib (emphasis here)
  - Round
  - Sirloin
  - Loinedge (emphasis here)
  - Rib
  - Chuck
- Limit adjustments to +/- .3 from initial PYG
  - e.g. Initial PYG: 2.5, can adjust up to 2.8, can adjust down to 2.2

Ribeye Area (REA):
- Measured with a USDA Ribeye Dot Grid (every 10 dots = 1 sq. inch)

- Base measurement (for formula) is an 11 in^2 ribeye
- If a carcass has a ribeye size larger than an 11 in^2, a minus adjustment (-) will be made to the PYG
- If a carcass has a ribeye size less than 11 in^2, an addition adjustment (+) will be made to the PYG
- To determine adjustment for ribeye size:

- o Once actual ribeye size (visual assessment) is determined, take difference (-) between base measurement and actual size
- o Multiple difference by 0.3 (standard)
- o If calculation has tenths place value, round up when it is .05 or greater, round down when .04 or less (e.g. Adjustment: - .15, round up to - .2; Adjustment: + .14, round down to + .1)
- o Example problems below

Base		Actual		Difference				Adjustment
11.0	-	11.0	=	0	x	0.3	=	0
11.0	-	12.0	=	- 1.0	x	0.3	=	- .3
11.0	-	10.5	=	+ 0.5	x	0.3	=	+ .15 (round up to + .2)
11.0	-	13.8	=	- 2.8	x	0.3	=	- .84 (round down to - .8)

- • To understand the impact REA has on final yield grade (adjustments to PYG) practice calculating REA adjustments with the table below

Base		Actual		Difference				Adjustment
11.0	-	9.9	=		x	0.3	=	
11.0	-	14.6	=		x	0.3	=	
11.0	-	15.5	=		x	0.3	=	
11.0	-	17.3	=		x	0.3	=	
11.0	-	16.5	=		x	0.3	=	
11.0	-	11.4	=		x	0.3	=	
11.0	-	19.2	=		x	0.3	=	
11.0	-	15.9	=		x	0.3	=	
11.0	-	10.4	=		x	0.3	=	
11.0	-	12.7	=		x	0.3	=	

Kidney, Pelvic, and Heart Fat (KPH):

- KPH is the fat inside the body cavity that once surrounded the intestines (pelvic cavity), kidneys, and heart (highlighted in figure below)

| 1½% | 2½% | 3½% | 4½% |
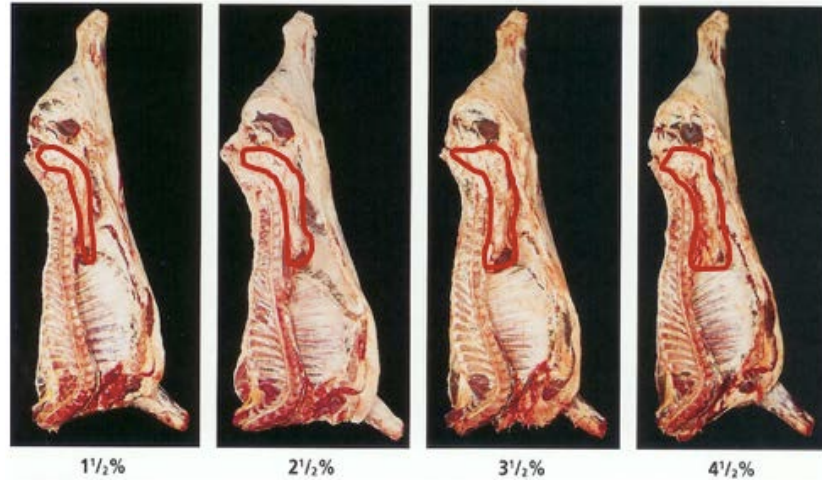
- KPH is visually assessed and reported as a percentage in relation to the carcass weight
- Because large-scale beef processing facilities remove KPH during the harvest process, there should be minimal KPH left when carcasses are evaluated
   - For this reason, KPH will be provided (as a %) on the carcass tag
- To understand the impact KPH has on final yield grade (adjustments to PYG), memorize the table below

KPH %	Adjustment
4.5	+ .2
4.0	+ .1
3.5	---
3.0	- .1
2.5	- .2
2.0	- .3
1.5	- .4
1.0	- .5

Hot Carcass Weight (HCW):

- HCW will be provided on the carcass tag and will not have to be visually assessed
- To understand the impact HCW has on final yield grade (adjustments to PYG), memorize <u>second</u> table below

HCW (100 lbs)	Adjustment	HCW Breaks	Adjustment
600 lbs.	---	0 – 12 lbs.	---
700 lbs.	+ .4	13 – 37 lbs.	+ .1
800 lbs.	+ .8	38 – 62 lbs.	+ .2
900 lbs.	+ 1.2	63 – 87 lbs.	+ .3
1000 lbs.	+ 1.6	88 – 99 lbs.	+ .4
1100 lbs.	+ 2.0		
1200 lbs.	+ 2.4		

HCW	Adjustment
600	---
13	+ .1
38	+ .2
63	+ .3
88	+ .4
700	+ .4
800	+ .8
900	+ 1.2
1000	+ 1.6
1100	+ 2.0
1200	+ 2.4

- Examples and practice HCW adjustments

HCW	Adjustment
625	+ .1
789	+ .8
1155	+ 2.2
850	
931	
1074	
1110	
763	
687	

Final Yield Grade (FYG):
- FYG can be calculated once PYG (& PYG adjustment if needed), REA, KPH, and HCW are determined
- FYG will be calculated and recorded to the nearest tenth (i.e. 1.9, 5.3, 3.5) on a scale from 1.0 – 5.9
- FYGs calculated to be <1.0 will be reported as 1.0 (i.e. FYG 0.7, reported as 1.0)
- FYGs calculated to be >5.9 will be reported as 5.9 (i.e. FYG 6.3, reported as 5.9)
- Example FYG calculations below

PYG / Adj.	REA	HCW	KPH	FYG
2.5 / 2.7	16.2 (- 1.6)	927 (+ 1.3)	2.0 (- .3)	2.1
3.7 / ---	14.7 (- 1.1)	850 (+ 1.0)	2.5 (- .2)	3.4
4.3 / 4.6	13.8 (- .8)	790 (+ .8)	3.0 (- .1)	4.5
5.8 / 5.9	12.2 (- .4)	789 (+ .8)	4.0 (+ .1)	5.9 (6.4)

- To understand the impact PYG, REA, KPH, and HCW have on final yield grade practice calculating FYG in the table below

PYG / Adj.	REA	HCW	KPH	FYG
2.5 / 2.6	16.1	935	1.5	
2.9 / 3.1	14.2	855	2.5	
4.1 / ---	13.5	781	3.0	
5.2 / 5.3	12.9	801	4.0	
3.5 / 3.6	13.8	913	2.5	
3.2 / ---	14.9	985	2.0	
2.5 / ---	18.6	1001	1.0	
5.7 / 5.9	10.8	698	4.5	
3.3 / ---	15.5	939	2.0	
4.5 / 4.8	13.7	850	3.5	

Youth Meat Judging – Beef Evaluation

Beef carcasses and cuts are evaluated and ranked on their estimated merchandising value. Merchandising value can be predicted by assessing product quality (marbling, carcass maturity, quality grade) and cutability (percent saleable product, yield grade). Carcasses and cuts resulting in the highest merchandising value should rank first. Because carcasses and cuts with advanced maturity (USDA Commercial or Utility) or quality defects (dark cutting beef, DFD) would result in a lower merchandising value, these should be ranked last. Details regarding advanced maturity and quality defects can be found in the Beef Quality Grading and Value Based Pricing sections.

Beef Judging Rules:
1. Carcasses and cuts of quality grade Prime will rank first, unless excessively fat (Yield Grade 4 or 5)
2. Carcasses and cuts identified as Top Choice (high Choice & avg. Choice) rank over low Choice or any lower grade (Select or Standard), unless excessively fat (Yield Grade 4 or 5)
3. For a lower quality grade carcass to rank above the next highest quality, a 1.5 difference in yield grade must be observed (e.g. low Choice YG 2.0 > Top Choice YG 3.8; Select YG 1.5 > Low Choice YG 3.2)
4. Carcasses and cuts identified as USDA Standard (or lower) or Dark Cutter will rank last

Notes Regarding Rules:
- Carcasses and cuts identified as excessively fat (Yield Grade 4 or 5) will go to the bottom pair, not immediately last
- Because beef cuts cannot be yield graded, fat thicknesses greater than 4.0 (PYG: preliminary yield grade) are considered excessively fat
- When considering rule #3, beef pricing sheet should be referenced for merchandising value differences

Beef Carcasses:
- Beef carcasses predicted to result in the highest merchandising value should rank first (value determined by quality and yield grade)
- Evaluate and rank carcasses on observed quality grade differences (Prime > Choice > Select > Standard)
- If carcasses are deemed the same quality grade, cutability (trimness & muscling) differences become priority when ranking
- Evaluate and take notes on the following characteristics:

Trimness	Muscling	Quality
- Opposite the ribeye - Lower rib - Round - Sirloin - Loin - Loinedge - Rib - Chuck - Cod/udder - Brisket - Kidney, pelvic, heart fat	- Ribeye - Round - Sirloin - Loin - Rib - Chuck	- Marbling (higher degree, greater amount) - Color - Firmness - Texture - Ossification - Fat color (white, yellow)
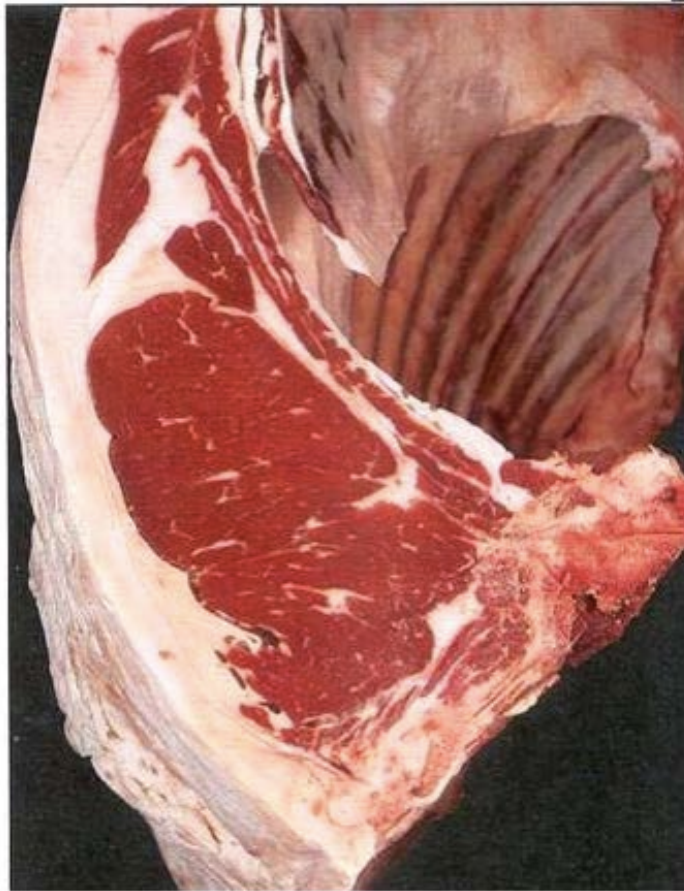
Beef Ribs:
- Beef ribs predicted to result in the highest merchandising value should rank first (value determined by quality grade and cutability)
- Evaluate and rank ribs on observed quality grade differences
  (Prime > Choice > Select > Standard)
- If ribs are deemed the same quality grade, cutability (trimness & muscling) differences become priority when ranking
- Evaluate and take notes on the following characteristics:

Trimness	Muscling	Quality
• Opposite the ribeye • Lower rib • Lip region • Back • Blade face • Seam fat (blade face)	• Ribeye • Back • Blade face – Eye of Blade	• Marbling (higher degree, greater amount) • Color • Firmness • Texture • Ossification

Beef Loins:
- Beef loins predicted to result in the highest merchandising value should rank first (value determined by quality grade and cutability)
- Evaluate and rank loins on observed quality grade differences (Prime > Choice > Select > Standard)
- If loins are deemed the same quality grade, cutability (trimness & muscling) differences become priority when ranking
- Evaluate and take notes on the following characteristics:

Trimness	Muscling	Quality
- Opposite the loineye - Tail region - Back - Loinedge - Sirloin - Sirloin face - Seam fat (sirloin face) - Cod/udder - Pelvic - Kidney fat	- Loineye - Back - Sirloin - Sirloin face	- Marbling (higher degree, greater amount) - Color - Firmness - Texture

Beef Short Loins:
- Beef short loins predicted to result in the highest merchandising value should rank first (value determined by quality grade and cutability)
- Evaluate and rank short loins on observed quality grade differences (Prime > Choice > Select > Standard)
- If short loins are deemed the same quality grade, cutability (trimness & muscling) differences become priority when ranking
- Evaluate and take notes on the following characteristics:

Trimness	Muscling	Quality
- Opposite the loineye - Tail region - Back - Sirloin face - Seam fat (sirloin face) - Kidney fat	- Loineye - Back - Sirloin face – longissimus dorsi, gluteus medius, psoas major	- Marbling (higher degree, greater amount) - Color - Firmness - Texture

Beef Rounds:
- Beef rounds are the only beef cuts not ranked on merchandising value
- Rounds predicted to result in the highest percent saleable product should rank first
- Evaluate and rank rounds on observed trimness differences
- If rounds are deemed comparable in trimness, muscling differences become priority when ranking
- Evaluate and take notes on the following characteristics:

Trimness	Muscling	Quality
- Round face – rump, knuckle - Flank edge - Seam fat (round face) - Center section - Cushion - Heel - Cod fat - Pelvic fat	- Round face – rump, knuckle - Center section - Cushion - Heel – Shank	- Marbling (greater amount) - Color - Firmness - Texture

Youth Meat Judging – Retail Cut Evaluation

Retail Identification cuts classes are evaluated and ranked solely on their predicted percent saleable product. Percent saleable product (a.k.a. cutability OR percentage closely trimmed retail cuts) is impacted by both trimness and muscling. Trimness refers to the amount and dispersion of fat while muscling refers to the amount and shape of muscle on the cut.

Retail Cuts:
- Retail cuts predicted to result in the highest percent saleable product should rank first
- Evaluate and rank retail cuts on observed trimness differences
- If retail cuts are deemed comparable in trimness, muscling differences become priority when ranking
- Evaluate and take notes on the following characteristics:

Trimness / Waste	Muscling	Quality
• Amount of external fat • Amount of plate waste • Amount of bone waste • Amount of inedible product (a.k.a. bone waste)	• Size of muscles (muscle names dependent of cut evaluated) • Amount of edible portion	• Marbling (greater amount) • Color

Accreditation:

Thank you to the following individuals, organizations, and institutions for which the information, figures, and pictures were utilized in the development of this manual:

- United States Department of Agriculture (USDA)
- American Meat Science Association (AMSA)
- The Ohio State University Meat Science Program
- Texas A&M University Meat Science Department
- Texas Tech University Meat Science Department
- Texas A&M AgriLife
- Academia & Industry Personnel: Meat judging coordinators at each of the aforementioned institutions, Gadberry, Tatum, Troxel.