Australian Intercollegiate Meat Judging
Secondary Schools Meat Judging Competition

AUSTRALIAN
INTERCOLLEGIATE
MEAT JUDGING
ASSOCIATION INC.

Teacher's Manual

Compiled by Lachlan James
(Scone Grammar School)

- Competition Outline

The Australian Secondary Schools Meat Judging Competition is designed to be an introductory competition for high school students wanting to learn more about the beef industry. The competition contains the following classes

- Two domestic beef carcass judging classes and questions
- One primal (shortloin) judging class and questions
- Retail cut and primal identification class (beef and lamb)

The competition is an excellent opportunity for students to develop skills prior to university and the opportunity of attending the senior competition.

- Carcass Judging

Both the carcass classes in the competition are domestic, however, one class may be slightly heavier than the other.

The time allocated to each carcass class is broken down into a stand back time (usually 2 min), an 'in' time (4 min) followed by another 1min stand back time after which students will need to answer 5 questions.

To be successful students must understand the relative emphasis on three primary factors for evaluation of carcasses and wholesale cuts. The three factors are **TRIMNESS, MUSCLING (Combining together to give yield) AND QUALITY**.

Here are 5 basic steps to follow
Step 1: Assess the muscularity of the carcasses
Step 2: Assess the trimness of the carcasses
Step 3: Determine the saleable meat yield of the carcasses
Step 4: Assess the meat quality of the carcasses
Step 5: Ensure the yield: quality weighting is around 50:50

Carcasses may have kill tags present on the body. Although these can be read try to discourage students from using these to place the class.

Beef Carcass Yield

Carcass yield or retail product yield refers to the amount of retail or saleable product which can be achieved from a given carcass weight, expressed as a total of carcass weight. The main factors which affect this value are the initial carcass weight, the amount of fat on the carcass and the degree of muscularity. Although similar weight carcass will be used in the competition, students need to be able to make a clear distinction between getting more meat because we are using heavier carcasses (ie: higher kg yield) versus getting more meat from carcasses of similar carcass weight (ie: higher % yield). The latter involves selecting animals with better carcass composition. A carcass is composed of muscle, bone and fat. Carcasses with high yield percentages have maximum muscle, minimum bone and optimal fat for a particular market.

Contributors to Carcass Yield

Fat

The primary determinant of retail product yield (%) is the amount of fatness or degree of finish on a carcass. The only accurate way of determining the amount of fatness on a carcass is to completely denude the carcass of all subcutaneous and intermuscular fat. Theoretically this is an exercise which can be done in either a laboratory or boning room, but it is very time consuming, costly and impractical. As a result, the industry uses indicators to predict degree of carcass fatness. Two fat depth measurements made at either the rib site where the carcass is quartered or the P8 site on the rump are used. Assessment of fat distribution across the carcass helps to fine tune the prediction.

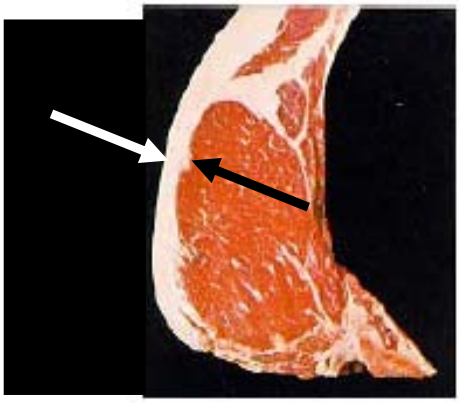
Carcasses differ in the way they distribute fat. Heavily muscled carcasses tend to distribute fat a little more evenly over the forequarter and tend to be leaner over the hindquarter. Carcasses with extreme muscularity usually lack finish over the butt altogether. Lightly muscled carcass tend to distribute fat very unevenly with large fat deposits through the flank up over the ribs and into the brisket. Large deposits necessitate costly and time consuming trimming and in doing so reducing the value of the carcass.

In general, carcass yield is very sensitive to fat. Exceptionally high yield can be obtained from carcasses with no fat eg: bulls used for manufacturing beef. However, most premium markets require some fat to market the product and ensure satisfactory eating quality. Most retail outlets are reluctant to sell product with more than 6mm of subcutaneous fat. Even in boning rooms, primals are being far more closely trimmed (6mm) than ever before. Fat sold around a cut of meat takes on the value of the cut eg: $10/kg, once trimmed it is worthless. In fact if you take into account the extra time required to trim fat carcasses, excess fat becomes a real liability. This explains the sensitivity of butchers and processors to fat.

Measuring Fat in a Beef Carcass

Beef fat depth can be measured at a point in the carcass known as the P8 site and at the quartering site. However, in the competition students must visually assess carcasses and can not use aids.

P8 site on a carcass



Arrows indicate the location for measuring fat depth over the rib eye

Determining Fatness in the Competition

Students should assess the carcasses at several locations including around the rib eye (at the quartering site) over the hindquarter (rump area) and over the forequarter. A carcass that is very fat will tend to have wavy undistributed fat with the total absence of lean evident through the fat on the hindquarter. Carcasses that are very lean will show blueing of the hindquarter (when the lean can be seen through the very thin layer of fat over the hindquarter).

The carcass on the right has less fat over the hindquarter than the other carcasses

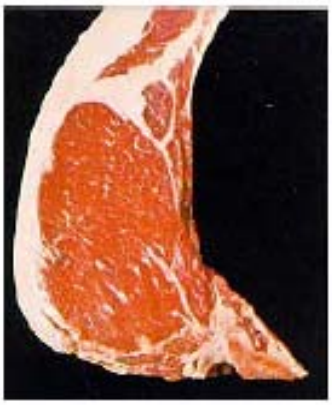
Muscularity

The other main factor in determining carcass yield is muscularity. Again, this cannot be objectively measured unless carcasses are completely dissected in a laboratory with every bit of muscle tissue being weighed, the ultimate figure would represent a lean meat yield devoid of any fat. In a commercial industry this procedure is not practical.

Beef is sold with some degree of fat between muscles or covering them. In assessing muscularity students need to look at indicators of it rather than the actual quantity. There are two ways this can be done:

Eye Muscle Area (EMA)

One way is to measure the area of the longissimus dorsi muscle also known as the rib eye. This measurement is made at the 10th/11th or 12th/13th rib quartering sites. The rib eye area is used because it is practical and has commercial significance. However, it must be remembered that the longissimus dorsi is just one muscle in the body and its relative size at the quartering site is only an indicator of total muscularity.



Assessment of Muscularity

This involves both dorsal and lateral (side on) assessments and takes into account the thickness and convexity (bulge) of muscle tissue relative to carcass frame size, having discounted for the effect of fat. Carcasses are attributed a muscle score from A being heavy through to E being light, with a plus or minus used for fine tuning eg: B–.

Determining Muscularity in the Competition

Students should assess the carcass at several locations including the rib eye area (at the quartering site) and over the hindquarter (rump area). A carcass that is very muscular will have a large bulging eye muscle and a thick bulging, convex butt. They will also usually have a full loin and thick forearm. Carcasses that lack muscularity will show a small tapering eye muscle and a concave thin tapering but. They will also usually have a shallow loin and thin forearm.

Quality

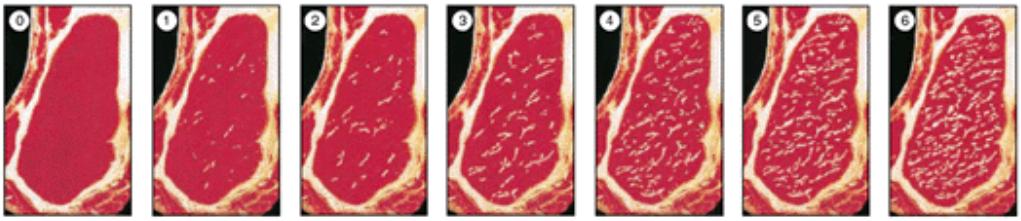
The eating quality of beef is never certain until it is in our mouths. This is frustrating to carcass judges as it would be so much easier if we could measure tenderness, flavour and juiciness in some way. Unfortunately we can't measure palatability so indicators must be used. The indicators are meat colour, texture, firmness and marbling.

Marbling

MARBLING (Intramuscular fat) **MB**

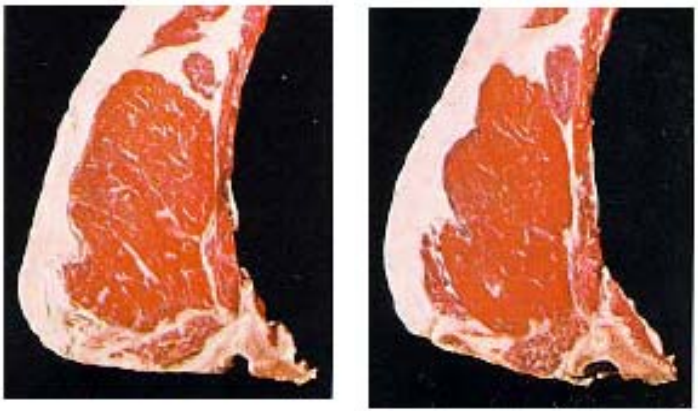
Marbling is the fat that is deposited between individual muscle fibres of the M. longissimus Dorsi. It is assessed in the chilled carcase and scored against reference standards in accordance with AUS-MEAT Chiller Assessment Standards.

BEEF MARBLING REFERENCE STANDARDS



Marbling is associated with tenderness and juiciness and directly enhances flavour. The marbling present in the meat in liquid state after cooking contributes to the juiciness of the meat. Research shows the direct contribution marbling makes to tenderness is small (about 10%). However, marbling indicates to what extent production factors affecting palatability have been managed. In order to have a high degree of marbling, an animal must have genetics to marble (predominantly British breeding), be fed a higher plane of nutrition, be backed up by consistent growth rates, usually in confined areas (feedlot) where little energy is exerted

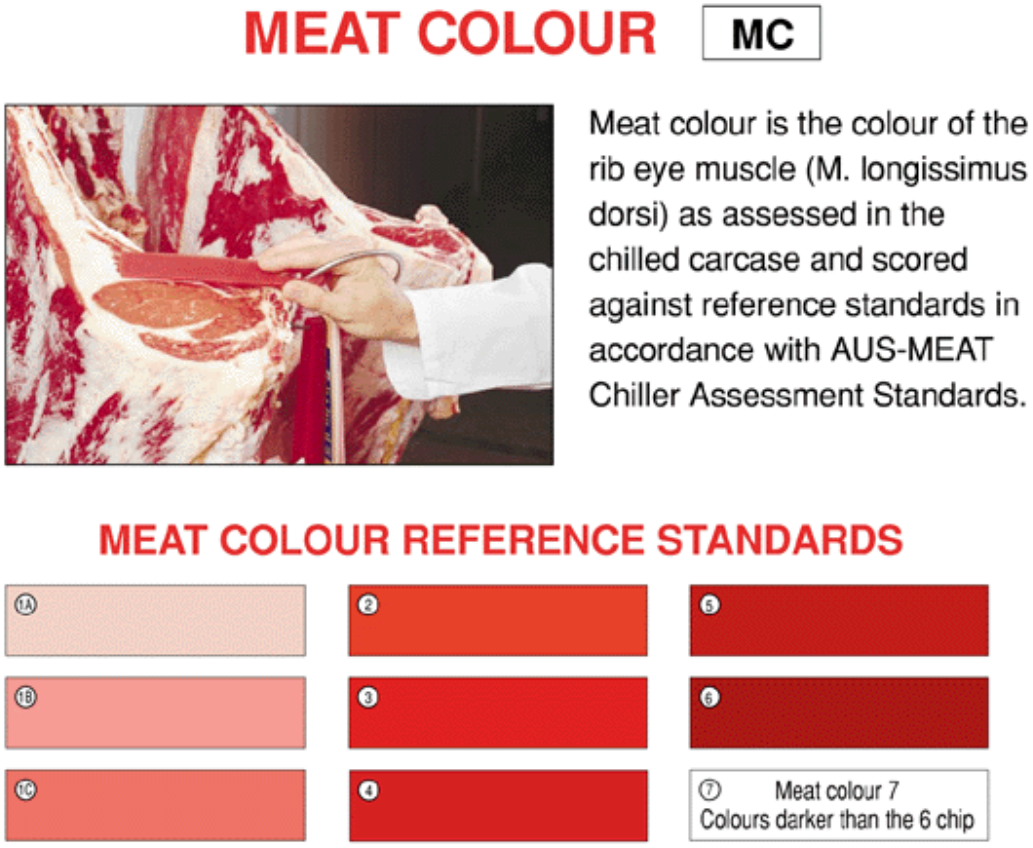
Marbling is associated with greater consistency and predictability of cooked product. As carcasses decline in marbling level the variability of the product increases. In circumstances where the pre slaughter environment (eg: at the feedlot and processing plant) and the post slaughter management are optimal, marbling as an indicator of palatability is even more significant. A carcass that has a combination of all of these traits is likely to have excellent palatability and will be readily saleable.



The carcass on the left displays more marbling than the carcass on the right

Meat Colour

A bright cherry red colour indicates a youthful product which has not been affected by the toughening effect of increased collagen and connective tissue found in older animals. It also indicates it has not been stressed prior to slaughter and that the animal from which it came has had excellent nutrition prior to slaughter. Meat colour is directly associated with pH. Beef which measures 5.4–5.7 for pH is more likely to be tender and more flavoursome, and have better shelf life than product outside this range.



Cattle that are killed with low body glycogen stores will result in carcasses with high pH. Carcasses with high pH also have darker meat colour. Carcasses with a deep purple/red colour are termed dark cutters and should be placed last in a class irrespective of yield attributes.

Texture
Texture of beef refers to the prominence of muscle bundle divisions and the degree of separation between them. Texture is affected by a number of factors and contributes to the level of tenderness in a muscle:
• age
• water holding capacity
• connective tissue
A fine texture is associated with tenderness. Such meat will have a fine silky texture when you stoke the cut surface lightly with your finger and the muscle fibres will not separate. This meat usually has a bloom, which is easy to recognise visually to experienced assessors. Students should learn to recognise these qualities, as they will not be able to touch the meat during the competition.

Firmness
Firmness directly relates to the water holding capacity of muscle. The water holding capacity of muscle is the extent to which muscle can retain its intracellular water during processing and heating. Firmness is very important to eating quality as it affects texture, juiciness and tenderness of cooked meat.

As pH declines, post slaughter the attraction to muscle proteins changes. As muscle pH declines to 5 water holding capacity changes. You will notice that an eye muscle with pH of less than 5.4 tends to be wet and sloppy with poor firmness. This is due to a reduced ability to bind water. Meat with a firm, dry cut surface is preferred. This meat is associated with optimal pH levels. It is less likely to weep when cut and is associated with cooked product which retains its juices. Soft sloppy meat and cut surfaces which weep have poor firmness and should be discounted.

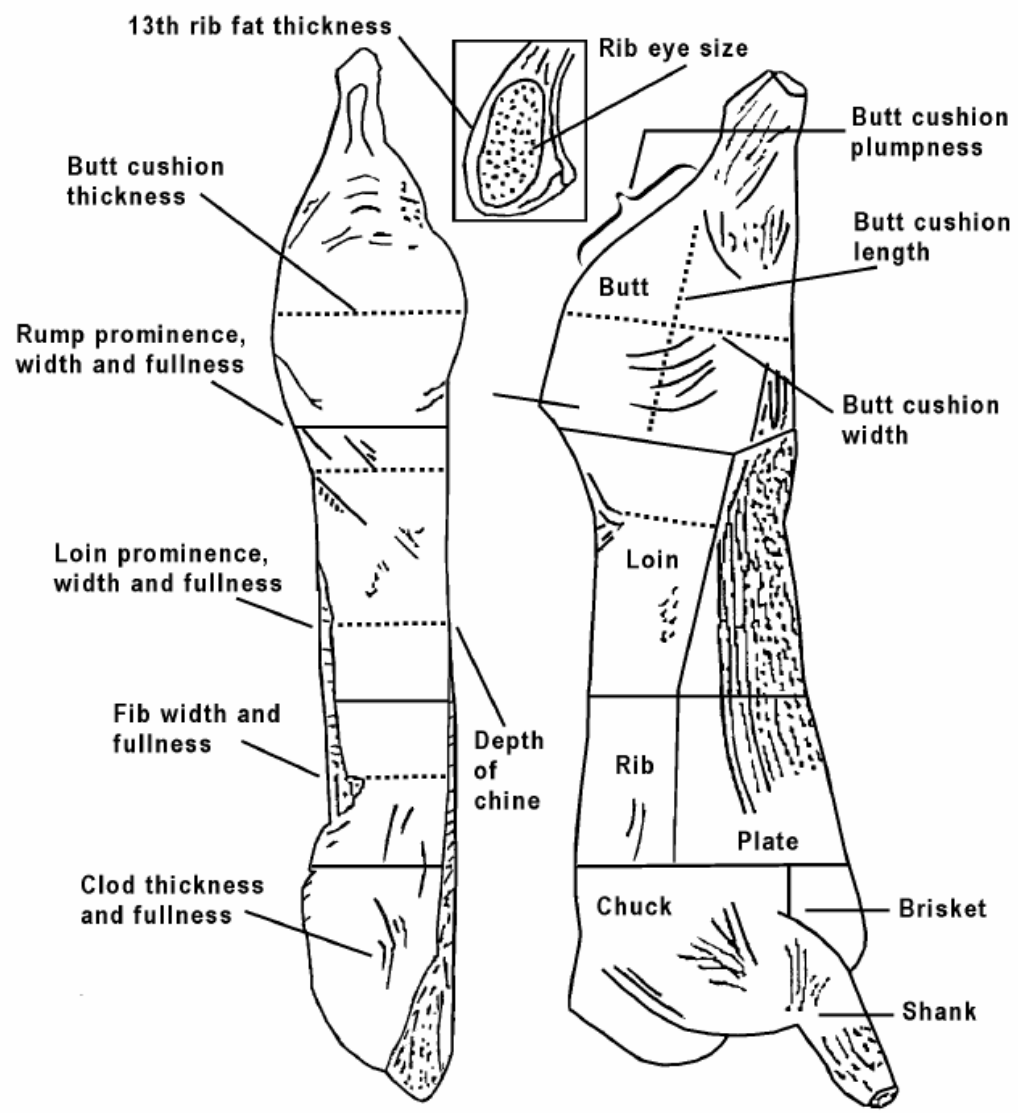
Fat Colour
The fat colour of a carcass is a byproduct of what they have been eating. Carcasses grazing green grass will tend to have a yellower fat colour than those fed grain. Yellow fat is a detrimental characteristic of a carcass. Higher quality carcasses will have a white fat colour.

Determining Quality in the Competition
The two main determining factors that students need to assess are the level of marbling and the meat colour. Although firmness and texture also determine quality it is less likely that they will be a determinant in altering a class placing. However, they are often used as the basis of observation questions. Marbling and meat colour should both be assessed in the rib eye and the quartered site. Carcasses that are determined to be a dark cutter should be placed last irrespective of yield.

Yield vs Quality Weighting
After assessing the yield and quality of each carcass students need to determine their placings. As the junior competition only has domestic carcass classes students need to ensure the yield: quality weighting is around 50:50. Thus:

- If two carcasses have a similar yield the carcass with the highest quality is placed above.
- If two carcasses are similar in quality the carcass with the highest yield is placed above.
- Generally speaking a carcass would have to have significantly higher quality to be placed above a carcass of slightly higher yield.

BEEF CARCASE



- Questions

After the time has elapsed for the placing questions, students will the asked 5 questions relating to the class. Students will not be able to view the carcasses/primals during the questions but can look at their notes. Questions are designed to test the students observation and comparision skills. Questions usually involve terminology relating to locations and observations. Sample questions may include

- Which carcass has the largest eye muscle.
- Which carcass displays the most amount of marbling in the rib eye.
- Between 2 and 4 which carcass has the thickest most muscular butt.

- Primal Judging Class

The primal judging class for the junior competition will be shortloins. Students need to assess the primals in a similar manner to the carcasses. Assessing muscularity, fatness and quality. Again the weighting of the characteristics is important with yield:quality ration being 50:50.

It is important that students view both faces of the shortloin before determining their placings.

The time allocated to the primal judging class is broken down into a stand back time (usually 2 min), an 'in' time (4 min) followed by another 1min stand back time after which students will need to answer 5 questions.

When judging shortloins students need to assess muscle fat and quality in the following locations.

Muscle

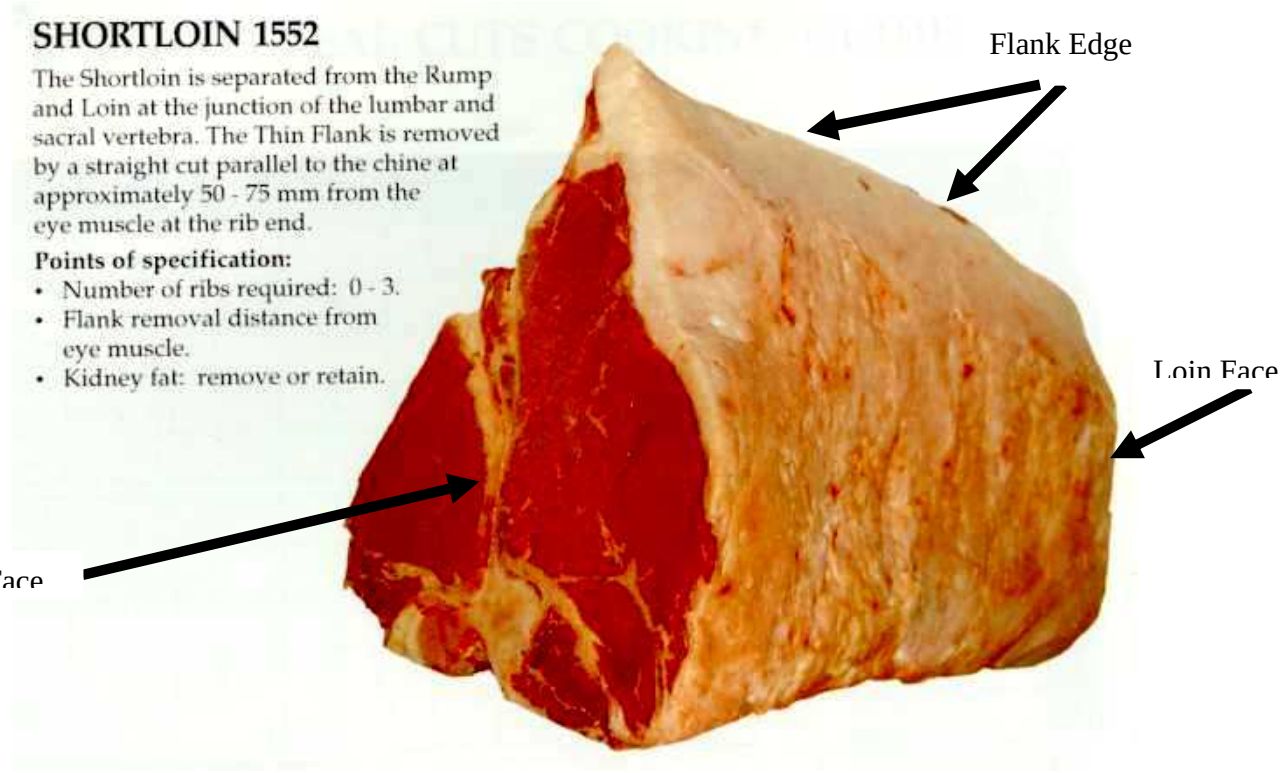
- Can be assessed in both the loin and sirloin faces. Primals with more muscle will have a greater lean surface.
- Muscular shortloins may also exhibit a fuller, wider, thicker back (however be careful not to confuse muscle with fat.

Fat

- Can be assessed by looking at the subcutaneous fat over both the loin and sirloin faces and the flank edge.
- Fat depth can also be estimated over the back.

Quality

- Students need to consider the same quality characteristics as in carcasses. They should look for quality characteristics in both the loin and sirloin faces.



- Retail Cut Identification

Students are required to indicate on their answer sheet the correct name with the samples presented at the competition. Samples are usually presented as a single cut in a supermarket style tray.

- **1. Rump:**

(Official Specifications)

- Cut from a boneless rump and must contain the Cap muscle (M. gluteobiceps), Eye muscle (M. gluteus medius), and Tail muscle (Tensor fasciae latae) trimmed to a length of 50 mm. Maximum depth of selvedge fat over the cap muscle 5–7 mm.

(Lachlan's Short Cut Id Method)

Large cut containing external fat and 3 muscles

Rump Steak

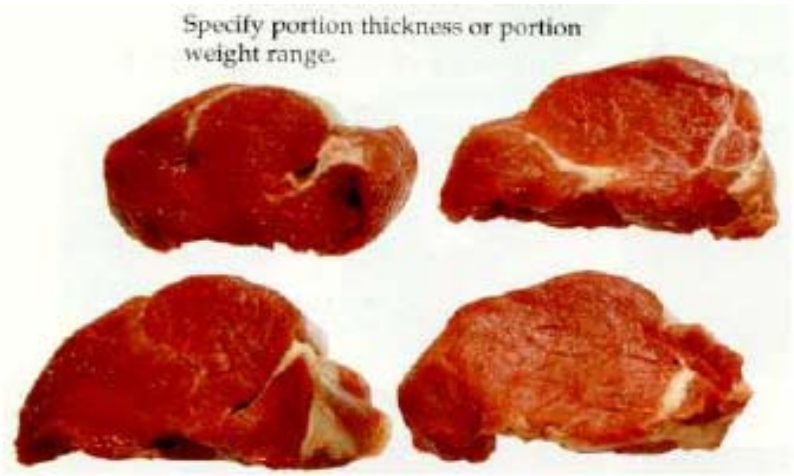
- **2. Fillet Steak:**

(Official Specifications)

- The fillet is removed from the underside of a full bone in Rump and Loin. Steaks to be cut at 30–35 mm thickness and silver skin (membrane) to be left in tact. Excess fat to be trimmed.

(Lachlan's Short Cut Id Method)

Small cut, usually with a rounded appearance, usually contains no marbling and has darker meat colour.



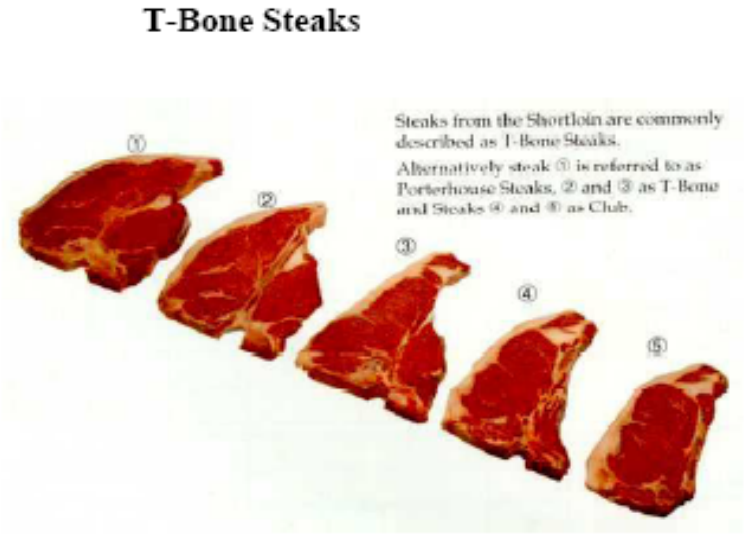
- **3. T-Bone Steak:**

(Official Specifications)

- To be cut from the sirloin and must contain the fillet muscle (M. psoas major). Length of tail 40 mm measured from the Loin eye muscle. Selvedge at depth 5–7 mm.

(Lachlan's Short Cut Id Method)

Larger cut with T shaped bone that touches the edge of the cut (1 of only two cuts that contain bone)



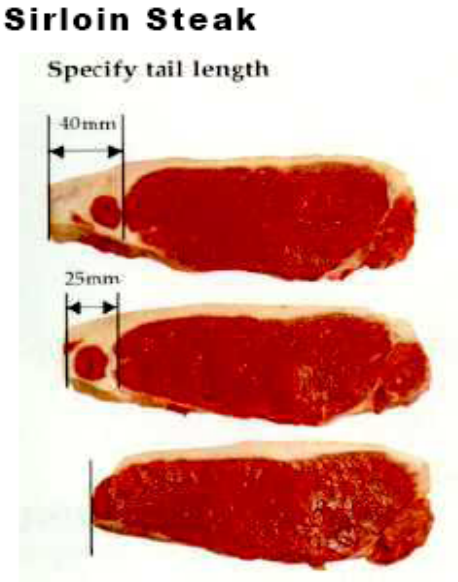
- **4. Sirloin Steak – Boneless:**

(Official Specifications)

- Cut from a one rib sirloin after boning and is minus the fillet muscle. Length of tail 40 mm, measured from the Loin eye muscle. Selvedge fat depth 5–7 mm.

(Lachlan's Short Cut Id Method)

Medium sized cut, contains external fat and a single muscle. Usually a rectangular shape. Can contain small to medium amounts of marbling



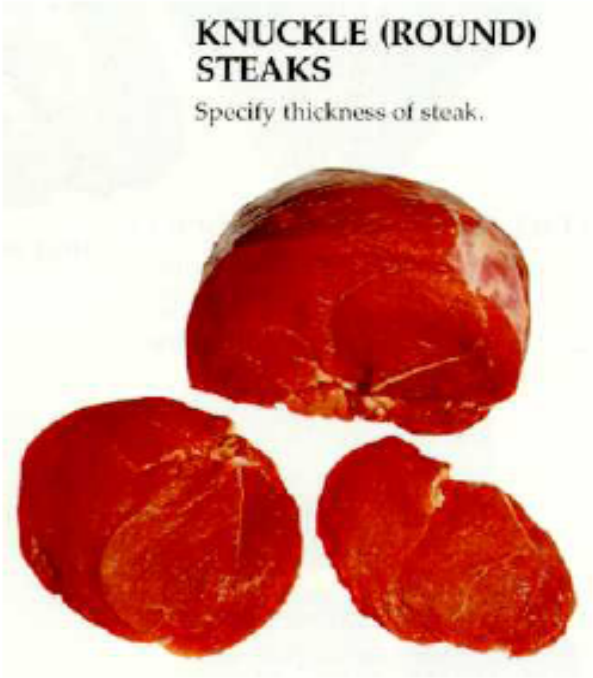
- **5. Round Steak:**

(Official Specifications)

- Cut from the primal – Round and must contain the Cap muscle (M. tensor fasciae latae). Excess fat to be trimmed. Selvedge fat depth 5–7 mm.

(Lachlan's Short Cut Id Method)

A large cut that has a round appearance. Usually no marbling



- **6. Topside Steak:**

(Official Specifications)

- Cut from the primal – Topside and must contain the Cap muscle (M. gracilis). Selvedge fat depth 5–7 mm.

(Lachlan's Short Cut Id Method)

A large cut that has a top cap (can either be on the right or left). Usually no marbling

- **7. Silverside Steak:**

(Official Specifications)

- Cut from the primal Silverside and must contain the eye muscle of the Silverside (M.semitendinosus) and the Silverside muscle (M. gluteobiceps). The silverskin and excess fat to be trimmed. Selvedge fat depth 5–7 mm.

(Lachlan's Short Cut Id Method)

A medium sized cut that has two muscles that appear to be a heel and toe shoe print. Usually a paler meat colour especially in the heel. Generally a rectangular shape.

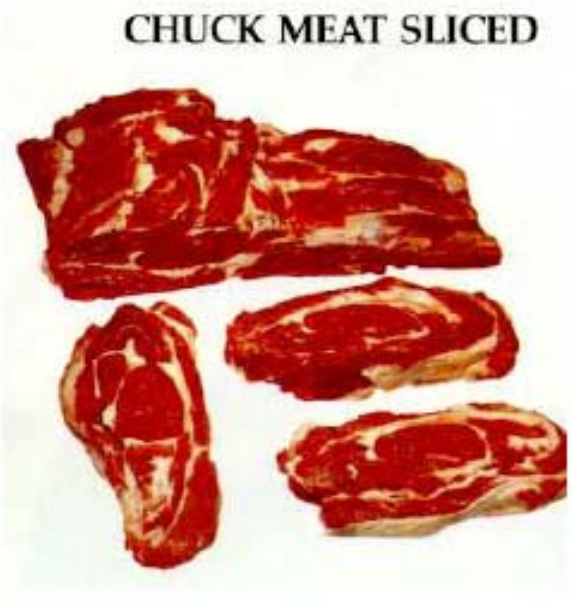
- **8. Chuck Steak:**

(Official Specifications)

- Cut from the primal – Chuck. To be one of the first four slices from the chuck. With a maximum length of tail muscle (M. Serratus ventralis) 100 mm measured from the eye muscle (M. Longissimus thoracis et lumborum). Cartilage and ligamentum nuchae to be removed.

(Lachlan's Short Cut Id Method)

The only cut that has no distingusing features apart from looking like a chunk of meat. If you can't work out what it is it must be chuck.



- **9. Blade Steak – Boneless:**

(Official Specifications)

- Cut from the primal – Blade. Sliced from the boneless blade (those muscles that surround the humerus bone (clod bone), excluding the clod muscle).Excess selvedge fat to be trimmed to a width of 5–7 mm. Any cartilage present to be removed.

(Lachlan's Short Cut Id Method)

Medium sized cut with an obvious streak of gristle through the center of the cut.

Blade Steak (Bone-less)

- **10. Blade Steak – Bone in: (X cut blade)**

(Official Specifications)

- Cut from the primal – Blade. Cut across the scapula bone beginning at the joint end. Bone in steaks include the muscles:
  • Roll of Blade (M. Supraspinatus)
  • Oyster Blade (M. infraspinatus)
  • Undercut muscle (Sub Scapuaris)
  • Bolar Section – associated muscles that surround the humerus bone
  The silver skin attached to the undercut muscle to be removed. Selvedge fat depth 5–7 mm.

(Lachlan's Short Cut Id Method)

Also called Y bone. One of only two cuts that have a bone. Bone never touches the side of the cut and is in the shape of a Y

Blade Steak (Bone-in)

- **11. Rib Eye Steak:**

(Official Specifications)

- Cut from the Wholesale cut – Cube Roll (removed from the Bone in set of ribs).
  The Rib Eye steaks will contain three muscles:
  • M. longissimus thoracis et lumborum
  • M. multifidi
  • M. spinalis
  To be cut at a thickness of 20 mm.

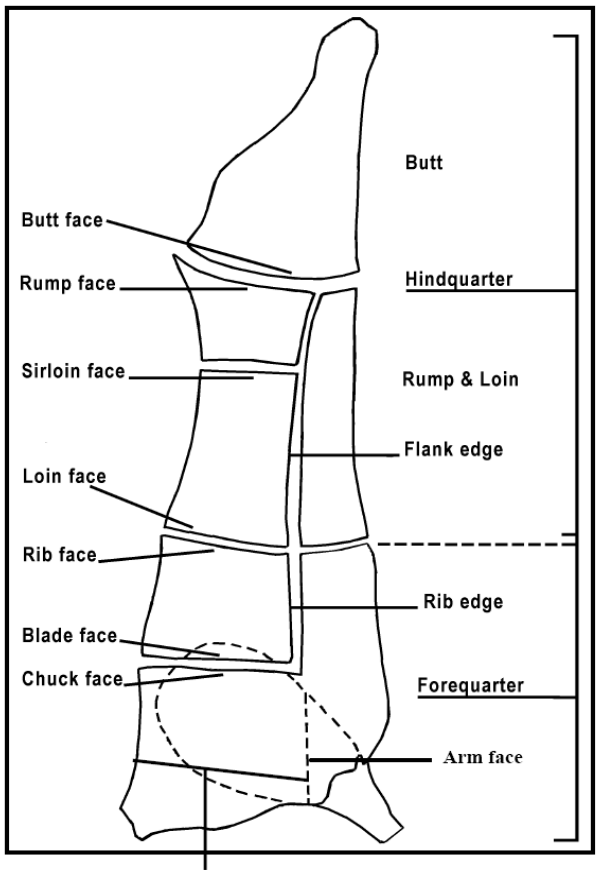
(Lachlan's Short Cut Id Method)

Smaller cut that usually contains marbling. Can be a circular to off circular to rectangular shape. No external fat.

Please note that the 2009 competition may also include lamb retail cuts that are not shown in the booklet.

- Primal Identification

This class is run in conjunction with the retail cut id class. Students are required to indicate on their answer sheet the correct name with the samples presented at the competition. Due to production requirements the samples may be presented in cryovac bags.



The competition may include:

Topside

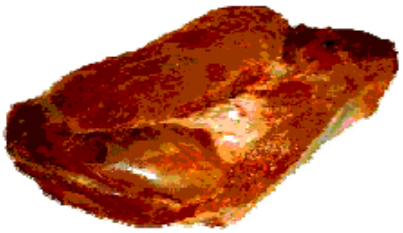
- Large primal with external fat

Topside 2000
The Topside is the inside portion of the butt of the Hindquarter. The Topside is removed along the natural seam divisions separating the Silverside and the Thick Flank

Silverside

- Flatter primal with the heel and toe present

Silverside 2020
Prepared from the outside portion of the butt of the Hindquarter. The Silverside is removed along the natural seam divisions separating the Topside and Thick Flank.



Eye Round

- Generally thicker and shorter than the tenderloin

Eye Round

Knuckle

- Larger round primal with no external fat

Rump

- Large primal with external fat and a rump face

Rump 2090
The Rump is prepared from the boneless Full Rump by the removal of the Flank (or tail of the Rump) on a line halfway between the large eye muscle of the Rump and the outer flank tip.

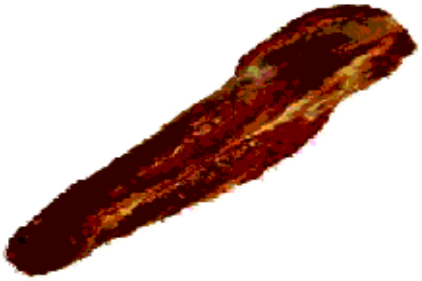
Striploin

- Medium sized primal with rectangular appearance, external fat.

Striploin 2140
The boneless Strip[loin is that portion of the Shortloin 1552 remaining after removal of all bones.
Points of specification:
Number of ribs required: 0 – 3
Flank removal distance from eye muscle

Tenderloin

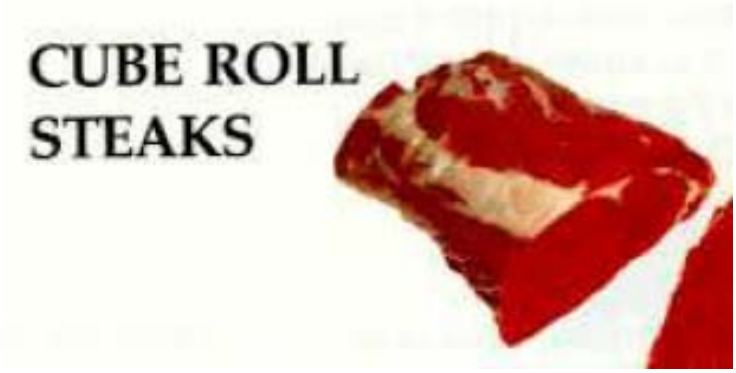
- A long tapering single muscle.



Tenderloin 2150
The Tenderloin is removed from the Rump and Loin complete with the side strap muscle retained.
Points of specification:
Fat cover
Trim to silverskin
Silverskin removed

Cube Roll

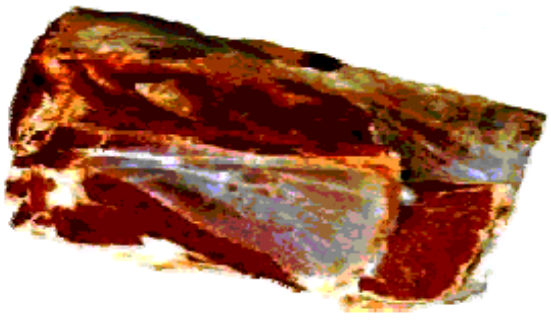
- Similar size to striploin, no external fat



Blade

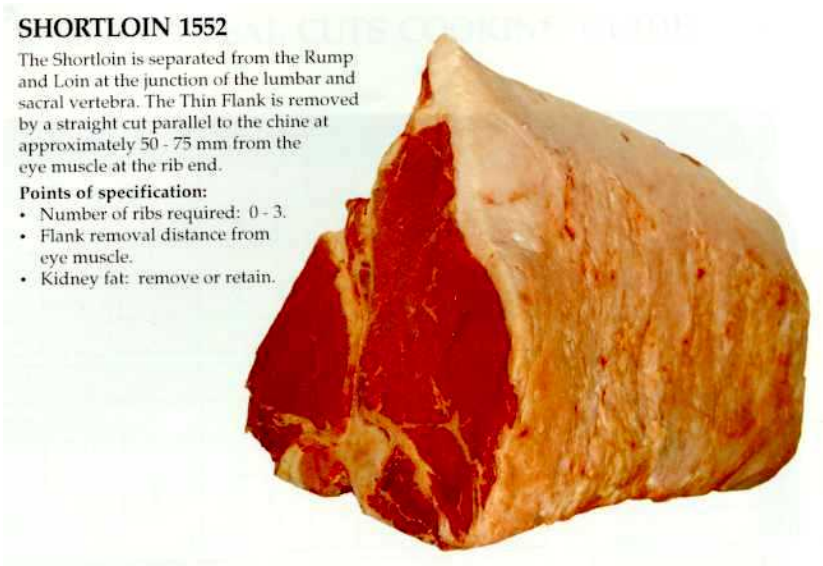
- One of two primals that contains bone, however, bone may be hard to locate.

Blade 2300
Consists of a large group of muscles which lie on the outside of the blade bone, and on the caudal side of the blade bone edge. The blade extends from the shoulder joint to the tip of the blade cartilage. The heavy exposed tendons at the shoulder joint end are removed.



Shortloin

- Same as primal judging exhibits. Large primal with external fat and a ‘T bone’ face.



- What to bring to the Competition

Students will need to bring:

- Pencils / Mechanical pencil
- Plastic clipboard
- A clean pair of gumboots
- A clean labcoat
- Clean hardhat
- Safety glasses

It is often cold in the chillers so students may wish to wear an extra jumper or pair of socks to the competition.

- General Conduct throughout The Contest

(1) Contestants will be identified throughout the contest by their contestant number.
(2) Contestants will be assigned to groups and are required to stay in their groups throughout the contest. A group leader will be provided for each group of contestants whose duty shall be to enforce the rules of the contest and to keep the exhibits of the class on which his group is working in an orderly arrangement.
(3) There will be positively no talking during the contest to team mates or other contestants in your group. Any questions regarding procedures etc must be referred to the group leader. Morning tea is the only period during the competition where talking is permissible within your group.
(4) **No notes, pictures or mechanical aids** will be permitted into the contest. Group leaders will report any violations which will be cause for disqualification of the contestant! A clipboard or similar writing support is allowed.
(5) Contestants will not be permitted to:
• Touch any part of any exhibit.
• Use any mechanical aid, such as a measure or light, etc.
• Talk to fellow team members at any time during the contest (except within the contestants allocated group during the morning tea period).
• Monopolise any one exhibit for an unreasonable length of time.
• Separate themselves from the class on which their group is working.
• In any way willfully obstruct the work of any other contestant. Sportsman-like conduct is expected at all times, especially in crowded circumstances.

Chiller Times and Conduct
Contestants must stay in their group at all items, moving to next class only on instruction from Marshals. In all judging classes there will be a 2 minute stand back time allocated at the beginning of each class. This period is to be observed fairly by all contestants. The marshals will do any necessary turning of carcasses. After stand back, legitimate handling of cuts and carcasses will be kept to a minimum, with **no lean surface being touched at any time**. There will be a 1 minute stand back at the close of all judging classes to conclude the class.

- Websites

The Australian Intercollegiate Meat Judging Association website has lots of photographs and information. Most of it is geared towards the senior competition so just make sure that students understand the requirements of the junior competition. The website has some good photographs which can be used to help students. The website is www.icmj.com.au

It is suggested that students bring and use pencils (ideally a mechanical pencil) to use during the competition. Pens often stop working due to the low temperatures in the chillers.