

Beef in the Classroom

Intermediate Level

Student Learning Guide



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Introduction and Overview

Why take this module?

- Knowledge of meat quality and factors contributing to tenderness is crucial in order to make smart consumer and cooking choices.
- Use a variety of moist and dry heat cooking methods appropriately applied to the choice cuts of meat and to the less tender economy cuts.
- Based on practical experience, choose and prepare a variety of meat products, taking into consideration such factors as quality, cut, method, and cost.

Prerequisites:

Successful completion of Food Basics Module FOD1010 with a mark of 50% or higher.



What will I learn?

You will:

- Explain what factors make meat tough or tender, and use various procedures to enhance tenderness (both before and after cooking).
- Define and describe the importance of inspection and grading meat.
- Recognize the wholesale and retail cuts derived from the carcass.
- Make decisions based on quality factors and the cut of meat, regarding the choice of appropriate cooking method.
- Use a number of moist and dry heat cooking methods on various types of cuts of meat
- Complete a minimum of six lab settings.

A suggested mark distribution is:

- 40% of mark for practical assignments (labs)
- 40% of mark for written assignments
- 10% of mark for product analysis and module reflection/portfolio
- 10% final exam

Kinds of Meat

Meat is a favourite food. It can be one of the most nutritious foods you can buy. You get more value for your money by selecting and cooking meat carefully.

The four basic types of meat discussed in this module are:



1. **BEEF**

Beef comes from cattle over one year old. It has a firm texture. The raw meat is usually a deep, bright red with creamy, white fat. Canadian beef today is leaner than 20 years ago. It contributes **THREE TIMES** more iron than lighter coloured meats, as well as essential B-vitamins and minerals. It is part of a healthy diet.

2. **VEAL**

Veal comes from calves up to four months of age who are fed a milk or milk-grain diet. The meat has little fat, connective tissue or marbling and is very light in color. It is very lean with a mild flavour and high water content. Raw veal has a delicate pink color.

3. **LAMB**

Lamb comes from young sheep usually six months to one year old. It has a delicate flavour, and is usually quite tender. Raw lamb is a pink colour with white fat. Meat from older sheep is called mutton. It has a stronger flavour and is not as tender as lamb.

4. **PORK**

Pork is the meat from hogs, or domestic swine. Most pork today comes from young animals between four to six months, producing a leaner, more tender meat. Fresh raw pork is light pink with a small amount of marbling and white fat. Canadian pork has half the fat when compared to 10 years ago. All trimmed cuts of fresh pork, except ribs, are 'lean' or 'extra-lean'. Lean meats, like pork, are an important source of high-quality protein, iron, zinc and B-vitamins.

About 70% of pork in the marketplace today is *CURED* or *PROCESSED* – like *Bacon* and *Ham* – while the remainder is termed "fresh".

Nitrite, salt, sugar, spices and flavouring are the key ingredients used to cure meat. Cured meat has a pink colour and a unique flavour. Salt, sugar and nitrites help prevent bacteria growth. Nitrite levels are lower than in the past. Canadian bacon, or back bacon, is an example of a lean smoked meat, which is more similar to ham than side bacon.

From Pasture to Plate

Many people in the meat industry contribute to putting beef on your plate at dinnertime. From the breeders to the meat cutters in your local grocery store, everyone plays an important part to ensure a safe and delicious food.

Alberta has the most cattle in Canada with approximately 5.9 million head (39% of Canadian total). Canada's beef industry operates in a free market environment. The amount of beef available and the price are determined by the market. Each of the industry sectors functions independently and they account for their own profits and/or losses. Some of the careers related to raising and processing cattle are described below:



1. ***The producer/farmer/rancher*** owns and raises the animal from birth until it weighs approximately 160 to 295 kg. The producer makes the decisions on the type of breed (genetics) being raised for the market. They take special care raising the cattle, making sure they are ready for the market. The calves may be sold at this time or kept for backgrounding. They are fed hay or grass until they weigh about 340 kg.



2. ***The feedlot operator*** buys the animal from the producer and decides on the food ration to be used during the last part of the growing period (12 to 20 weeks). This is called the finishing process. Many feedlots in Alberta feed barley, a type of grain to cattle. They also decide when to market the animal for optimum profit. Most of the cattle raised for the market (75%) will be sold to the packer-processor before the age of 18 months and at a weight of 475 kg to 600 kg.



3. ***Canadian Food Inspection Agency*** meat inspectors, in federally inspected plants, examine every animal and every side of beef before and after processing. Inspectors check for disease or anything unusual in the carcass. This is done to ensure the safety of meat and meat products. Beef is then stamped with an inspection stamp, when it passes inspection.



4. *The packer-processor or meat cutter* converts the products into primal cuts. Some beef is sold as “swinging beef” –whole side, fronts or hindquarters. A Packer-processor may cut the meat further into retail cuts. The primal cuts are typically stored and shipped in strong, cryovaced bags. Once the meat is processed into retail cuts it is typically put in vacuum-packed bags.



5. *Canadian Beef Grading Agency* grades the beef and determines the yield. This influences the initial value and appropriate use of the meat in the food industry.



6. *Processor-purveyor* buys the product and further processes or adds value to the product before selling it either to a distributor or directly to the foodservice operator. One example could be a pre-marinated steak.



7. *Distributors/meat cutters* (at local stores) can further cut and wrap meat suitable for each consumer. Meat is sold with a full line of food and non-food items so that the customer has one-stop shopping convenience.

From the time the animal is born, it takes approximately two years for beef to reach the customers plate. Each part of the industry influences the outcome of the final eating experience. When all of the sectors perform to maximum potential, the result is a satisfied customer.

It's in Your Hands: Food Safety

Health Canada estimates that 11 to 13 million cases of food-borne illness occur each year in Canada and humans are the main cause of these illnesses. All perishable foods, including meat, can contain bacteria. Many steps can be taken so no one becomes sick. Studies estimate that 85% of all cases of foodborne illness could be prevented if food is handled properly.

Most bacteria which cause foodborne illnesses cannot be seen, smelled, or tasted. One of the most common causes of illness is food left at room temperature. The **Danger Zone** is between 4 and 60°C (40 to 140°F) and room temperature is clearly in this range. Bacteria grow rapidly when the temperature is between 4° and 60°C and they have the moisture and food they need to grow. Some can double as quickly as every 15 minutes. With proper storage, the safety, nutritional value and quality of meat can be preserved.

1. Fresh Meat

Fresh meat should be stored no longer than one to three days in the fridge, on the bottom shelf or in the meat compartment to ensure meat juices do not drip onto other foods. For fresh ground meat, store only one day. Leave in its original container or remove and ensure product is properly sealed.



2. Frozen Meat

Meat purchased frozen should be stored in the freezer (-18°C/0°F) in its original wrapping. For freezing fresh meat, remove it from its original packaging and re-wrap it into moisture-vaporproof “freezer bags”. It is also wise to separate individual servings with a double layer of wrapping material.



Never re-freeze previously thawed meat. Freezing does not kill bacteria. When meat is thawed, bacterial growth starts again. If meat is frozen and thawed again, bacterial growth starts at a higher level. There may be enough bacteria to cause food-borne illness. “Previously frozen” meat purchased at the store **MUST** be cooked for these safety reasons.

3. Canned Meat

Most canned meats can be stored in a cool, dry storage place. Large canned hams over 1 kg are perishable because they have not been completely sterilized. Store them in the fridge to prevent spoilage.



4. **Cured Ready-to-eat Meats**

Cold cuts, ham, bacon and wieners should be wrapped tightly to prevent drying. Use within four days.

5. **Leftover Meat**

Leftover meats should be stored in an airtight container in the coldest part of the fridge and used within three to four days.

6. **Shelf Life**

Refrigerated beef has a limited shelf life before it spoils. Several variables strongly influence the length of shelf life, and each variable must be correctly managed to maximize shelf life. Freezing extends shelf life.

Table 1-1: Storing Meat (from "packaged on" date or purchase date from butchers)

Types	Refrigerator	Freezer
Ground beef	1 day	2-3 months
Stewing beef, short ribs, stir-fry strips, kabobs	2 days	3-6 months
Steaks	3 days	6-9 months
Roasts	3 days	9-12 months
Vacuum packaged (thawed meat)	2 days	6-9 months
Cooked meats	3-4 days	2-3 months

You can't tell if food is safe by smelling or looking at it. IF IN DOUBT, THROW IT OUT.

Tips:

- Always freeze fast in the freezer
- Defrost slowly
in the refrigerator
or
with cold running water
- Defrost quickly using the microwave oven
- Do NOT thaw on the counter

...it's in your hands: Food Safety cont'd

Four Simple Steps for Handling Meat

All meats need to be stored and cooked properly to prevent bacteria from growing. There are four simple steps for handling meats.

1. Clean it

- ✓ Wash hands in warm soapy water before and after handling raw meat.
- ✓ Wash hands for 20 seconds - that's 2 choruses of "Happy Birthday"
- ✓ Clean all utensils and cutting boards in hot soapy water. Sanitize with a dilute bleach solution (about 5 mL (1 tsp) bleach per 750 mL (3 cups) of water). Let them air dry.
- ✓ Place cooked meat on a clean plate.
- ✓ Washing raw meat before cooking is not recommended as this greatly spreads bacteria to other areas

3. Chill it

- ✓ Use the 2 Hour Rule. Refrigerate or freeze within 2 hours of purchase or preparation.
- ✓ Pick up meat, fish and poultry last at the grocery store.
- ✓ Put in the fridge FIRST after you get home.
- ✓ Travel with meat in a cooler on hot days, and reduce 2 Hour Rule to 1 Hour Rule
- ✓ Defrost meat in the fridge, microwave or under cold running water.
- ✓ Do not defrost meat at room temperature (e.g. on the kitchen counter).
- ✓ Put leftover meats in the fridge immediately.
- ✓ Marinate meats in the fridge.

2. Separate it

- ✓ Do not put ready-to-serve food in contact with raw meat. This causes cross-contamination*.
- ✓ Store raw meat on a plate on the lowest fridge shelf to prevent meat juices from dripping onto other items in the fridge.
 - ✓ Keep meat covered; some bacterial live in the air and may settle on the meat surface.
 - ✓ Separate raw meats from other foods and use clean utensils and cutting boards for vegetables and each meat.

4. Cook it

- ✓ Use a food thermometer or temperature indicator. This is the only way to tell if your food has reached a high enough internal temperature to destroy bacteria.
- ✓ Use the Temperature Rules chart found on the next page for safe doneness temperatures.
- ✓ Boil left-over marinade for at least 5 minutes or throw it out.



* *Cross-contamination is when bacteria is transferred from meat or juices to another food or utensil.*

Accessed from Beef Information Centre (2008) and the Canadian Partnership for Consumer Food Safety Education www.canfightbac.org (2008)

...it's in your hands: Food Safety cont'd

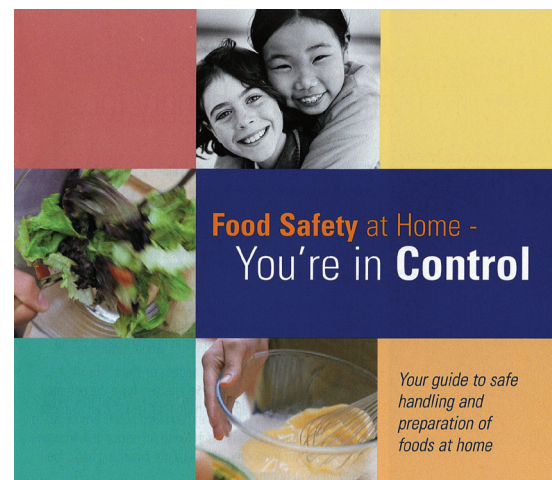
Ground meat deserves our special attention when we buy, store or cook it. Since bacteria love surfaces, bacteria have plenty of chances to get into the meat. If you think about a steak, the surfaces are only the top, bottom and sides. When a steak is cooked rare, it has to be seared on all sides to destroy the bacteria. Ground meat is like taking a steak and grinding it up. The surface bacteria are mixed in and more surfaces are made that the bacteria can live on. It's important to cook ground meat to 71°C (160°F) so the bacteria are dead.

Temperature Rules for Safe Doneness (<i>Canadian Industry Standards</i>)	
Ground beef/Pork	160° F (71° C)
Ground chicken/Turkey	175° F (80° C)
Beef, lamb and veal roast and steaks	145° F (63° C) Med-rare
	160° F (71° C) Medium
	170° F (77° C) Well
Pork chops/roasts/fresh cured ham	160° F (71° C) Medium
Ham, ready-to-eat, fully cooked	Cold or 140° F (60° C)
Whole turkey (stuffed) and chicken (stuffed or not)	180° F (82° C)
Stuffing	165° F (74° C)
Whole turkey (without stuffing)	170° F (77° C)
Chicken/turkey pieces	170° F (77° C)
Rolled stuffed beef roasts or steaks (e.g. London Broil)	160° F (71° C)
Minute Steak (or meat labelled Delicitized/Diced/Tenderized or Cubed Steak. NOT Fast-fry Steak)	160° F (71° C)
Egg dishes, casseroles	160° F (71° C)
Battered meat/seafood - Do not undercook. Cook following package directions	
Fresh meats marked "Seasoned" on label	160° F (71° C)
Leftovers, reheated	165° F (74° C)

For more information on food safety, see:

“Food Safety at Home – You're in Control”

Order this resource for free from the Beef Information Centre at www.beefinfo.org



Canadian Meat Inspection: World Class Safety

Canadian consumers want to be sure the food they eat is safe and wholesome. Extensive meat inspection programs, along with residue testing, are in place to ensure the safety of meat and meat products. Imported products must also meet these safety standards.

The inspection stamp shown indicates the primal cut has been inspected by meat inspectors with the Canadian Food Inspection Agency.



Canada has a meat inspection system second to none in the world. Under the Canadian Food Inspection Agency's inspection program, veterinarians and trained meat inspectors examine every animal and every side of beef before and after processing. They then compare the beef to a strict set of standards to ensure that it is healthy and wholesome. The inspector checks for animals with diseases and if there are signs of recent drug injections. This rigorous inspection procedure ensures consumers end up with wholesome foods.

What happens if the standards aren't met?

If the animal or carcass is suspected of being sub-standard, it is held for further testing. If it is confirmed that the animal is sub-standard, it is used for INEDIBLE beef by-products or is condemned. For more information on inedible beef by-products, see pages 1-17 to 1-18.

What about medications, vaccinations and hormones used in raising beef?

All drugs used for livestock medications and vaccinations must undergo thorough testing by the Bureau of Veterinary Drugs and Health Canada before any substance can be licensed for use. Any of these drugs that might remain in meat are called residue. High standards are set so that there are no residues or miniscule residue levels in the animal when it is processed. Consequently, medications to animals are not a health problem for meat.



Additionally, all carcasses are subject to random residue testing for antibiotics, pesticides, hormones and industrial pollutants. In 2004/2005, random testing results from beef showed excellent compliance with the standards set for antibiotics, hormones, and heavy metals.

Why are these items used in raising beef?

Antibiotics and Vaccinations

Animals are similar to people, in that they too can get sick. Antibiotics are used for preventative purposes and to treat the sick animals. Each rancher must follow strict guidelines when using medications in animals. One of the guidelines states that the animal cannot be processed for a certain amount of time following the use of an antibiotic or vaccination. This is to make sure that the medication has passed out of the body. This way there is no medication residue or miniscule residue levels in the meat.

Hormones

Estrogen implants may be placed in calves' ears to help produce leaner and faster growing beef. This may bring the cost of production down by 10-15%. Estrogen implantation in beef livestock is NOT A HEALTH HAZARD for humans. Both men and women continuously produce estrogen in much greater quantities than that contained in a serving of estrogen-implanted beef. For example men produce 136,000 nanograms of estrogen daily and non-pregnant women produce 192,000 to 1,192,000 nanograms of estrogen daily. Other foods have HIGHER estrogen than beef (See Table 1-2).

Table 1-2: Estrogen Content in some Common Foods

Food	Amount of Food	Amount of Estrogen (nanogram)*
Non-implanted beef	100 g	1.5
Implanted beef	100 g	2.2
Milk	250 mL	35.9
Cabbage, fresh, grated	325 mL	2,381
Soybean oil	15 mL	28,773

* Note: A nanogram is one billionth of a gram, which can be compared to one blade of grass in an entire football field.



...Canadian meat inspection cont'd

Why is fresh meat so red? Do they add dyes?

Many consumers mistakenly believe that fresh beef is dyed to keep the bright red colour. It is **ILLEGAL** to add colouring, additives, or preservatives to fresh beef.

Fresh beef is bright red because of a naturally occurring blood compound called oxymyoglobin that is formed in the presence of oxygen. Clear plastic wrap is used in meat packaging so the right amount of oxygen is available to keep the bright red colour. If the meat is deprived of oxygen, it will change colour. That is why raw ground beef may be a bright red on the outside, and darker on the inside. The inside has not been exposed to oxygen like the outside. Thus, darker meat is not always an indication of older meat.



Making the Grade: Canadian Beef Grading

Once beef has been inspected and deemed safe, it receives a federal or provincial inspection stamp. The packer-processors then have the choice of having the Canadian Beef Grading Agency grade their meat. A carcass grade and yield will determine the initial value and appropriate use of the meat in the food industry.

The **GRADE** (see pages 1-14 to 1-15) is based on factors that affect eating quality. The **YIELD** (see page 1-16) is directly related to the quantity of lean meats that is usable.

Marbling is an important part of beef. It not only determines the grade of beef, but more importantly to the consumer, it affects the flavour and juiciness of the beef. Marbling is the visible fat streaks within the lean meat. Thus, the more marbling within the lean of the beef, the more juicy the beef is. It is a major criterion in the present beef grading system.



Beef Grades

Canada A (or higher) (stamped in red ink on the carcass)

Canada Prime, AAA, AA, and A are the best quality of beef.

Characteristics include:

- √ A youthful animal
- √ Grain of the meat is fine and muscle is firm
- √ Fat on the meat must be white and firm
- √ Lean is a bright red colour

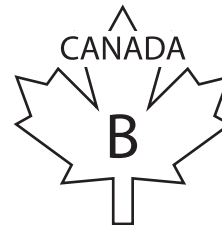


HINT: the more As in the grade name, the more marbling fat there is in the meat. That means a juicier, more tender and more flavourful piece of meat! 95% of all Alberta beef is graded Canada A or higher. Canada Prime beef is the highest grade and usually available in fine dining restaurants.

Canada B (stamped in blue ink on the carcass)

Characteristics include:

- √ Youthful animal
- √ Medium dark in colour
- √ Moderately firm texture
- √ Slightly coarse meat
- √ Less marbling than Canada A
- √ Fat is slightly yellow



Remember that these grades are still safe to eat because they have the inspection stamp. They aren't Canada A because there isn't enough fat, or it isn't white enough, or the meat lacks the desired muscling or colour. One percent of all Alberta beef is Canada B.

Grade	Characteristic
B 1	No marbling or <2 mm exterior fat
B 2	Fat has yellow colour and may be soft
B 3	Medium to poor muscling
B 4	Meat colour is too dark

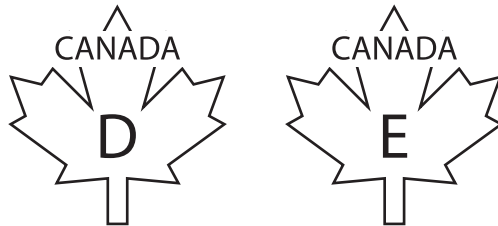
...beef grades cont'd

Canada D and E (stamped in brown ink on the carcass)

These are mainly older animals that are used primarily for ground beef or processed meats like sausages or lunchmeats. These carcasses are generally marketed as ungraded product.

Canada D is mainly from mature cows. Less than five per cent of Canada's graded beef is Canada D.

Canada E is mainly from bulls. Less than one per cent of Canada's graded beef is Canada E.



Beef Yields

Parts of meat




Carcasses are comprised of four main parts:

1. Meat or muscle tissue
2. Bone
3. Connective tissue
4. Fat

To indicate how much usable meat is available, (**only the Canada A or higher**) carcasses are assessed to a lean meat yield class. This is done by the Canadian Beef Grading Agency.

Yield is determined by measuring the exterior fat thickness and the length and width of the rib-eye muscle. Each carcass will be sliced between the 12th and 13th rib to drop the front quarter down. The grader will check and measure the fat covering. Why between the 12th and 13th rib? Research has shown a direct link between the amount of fat and the amount of lean, usable meat at this place on the carcass and the rest of the carcass.

There are three classes of yield:

<u>Canada 1</u> 59% or more of lean, usable meat	
<u>Canada 2</u> 54-58% of lean, usable meat	
<u>Canada 3</u> 53% or less of lean, usable meat	

Canada is world famous for its consistent production of quality and high yielding carcasses.

Benefits of Beef By-Products

The industry uses approximately 95% of the carcass.

If the typical grade A carcass only yields 59% of meat, what happens to the rest of the carcass? A carcass is a lot more than steaks, roast beef or hamburger (part of the 59%). Around 36% is used to make edible, inedible and pharmaceutical beef by-products.

Edible Beef By-products are products that can be consumed. The majority of edible beef by-products contain gelatin.

Gelatin is made from cartilage, tendons and bones. Gelatin may be found in:

Hard cheese
Ice cream
Mayonnaise

Jello
Gummi Bears
Gum

Canned meats
Marshmallows
Yogourt



Variety meats are edible organs and glands of a beef animal, including: heart, tongue, liver, kidney, tripe (stomach walls), and testicles (Rocky Mountain or Prairie Oysters). Variety meats are edible by-products.

Inedible Beef By-products

Beef by-products provide a way to use everything and create products that we use every day.

Here are examples of some products made from inedible by-products:

From the hide

Leather boots
Leather luggage
Leather shoes

...benefits of beef by-products cont'd

From the fat

- Deodorants
- Fabric softeners
- Plastics
- Shaving cream
- Detergent
- Floor wax
- Shampoo
- Candles
- Crayons

From the bones

- Toothpaste
- Bone china

From leftover meat portions

- Pet foods

From entrails

- Violin strings



Pharmaceutical Beef By-Products

The medical world also relies on the by-products from cattle to produce a number of medications and treatments that make a difference in people's lives every day. Prior to the 1980s, people with diabetes relied totally on insulin supplies extracted from beef and pork pancreases. By-products from cattle also assist in the treatment of the following: anemia, allergies, parathyroid deficiencies, respiratory diseases, jaundice, rheumatoid arthritis and leukemia.



Tender Meat: A Perspective from Ranchers & Processors

There are many factors that affect the tenderness of beef and therefore, the eating quality. Cooking methods can often enhance tenderness and improve eating quality.

1. Connective Tissue

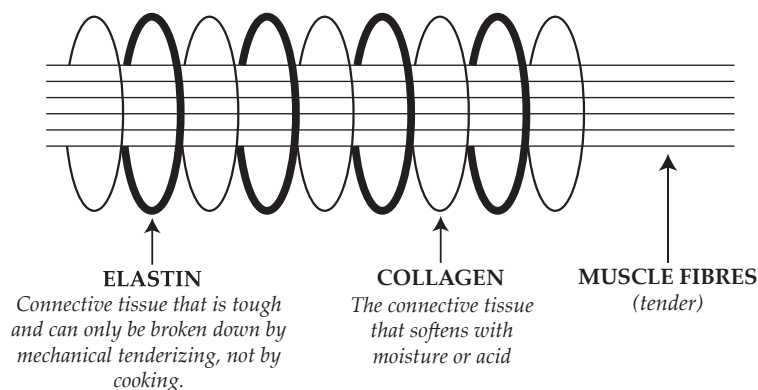
A piece of meat can be divided into muscle fibres. Around the muscle fibres are connective tissue. The muscle fibres look like a handful of dry spaghetti with several elastic bands (connective tissue) interwoven and holding it all together.

There are two main types of connective tissue:

Collagen: can be broken down by marinating or moist heat cooking.

Elastin: or gristle is a tough, rubber-like protein. It cannot be broken down by cooking. However, mechanical tenderizing prior to cooking such as cutting, grinding and pounding can tenderize elastin.

The more connective tissue you have, the tougher and chewier the meat will be. As the animal ages the connective tissue changes - this makes the meat tougher.



2. Aging Process

If you were to try beef that hasn't been aged, you would probably find it tough and unpalatable. To reduce toughness, the meat processors let meat 'age'. Did you remember that meat has been cut and stored in the strong, cryovaced bags? This is one way meat ages. It is referred to as "wet aging" – a technique that removes oxygen from the bag and then the bag is heat sealed to make it airtight. Other meat processors hang the carcass upside down usually by the hind shank before cutting into primal cuts. This is known as "dry aging". Aging allows enzymes that are in the meat to begin loosening the connective tissue and relaxing the muscle fibres. The beef gains tenderness quickly and depending on the process is typically aged up to 14 days dry aged, while wet aging can continue up to 28 days.

Please note meat cannot be aged safely at home.

3. Grading and Marbling

The higher the grade, "A, B, D and E", the more tender the meat. Just like school, "A" is the highest grade. For meat to be classified as "A", the meat must be bright red in colour, have good to excellent muscling, have white and firm fat, be from a youthful animal and have minimum marbling.

Marbling is the streaks of fat found within the lean meat. The more marbling there is, the more juicy and flavourful the meat will be. The more "As" assigned to Grade A meat means there is more marbling. Grade AAA vs. AA or A has more marbling and thus will be more flavourful and juicy when cooked.

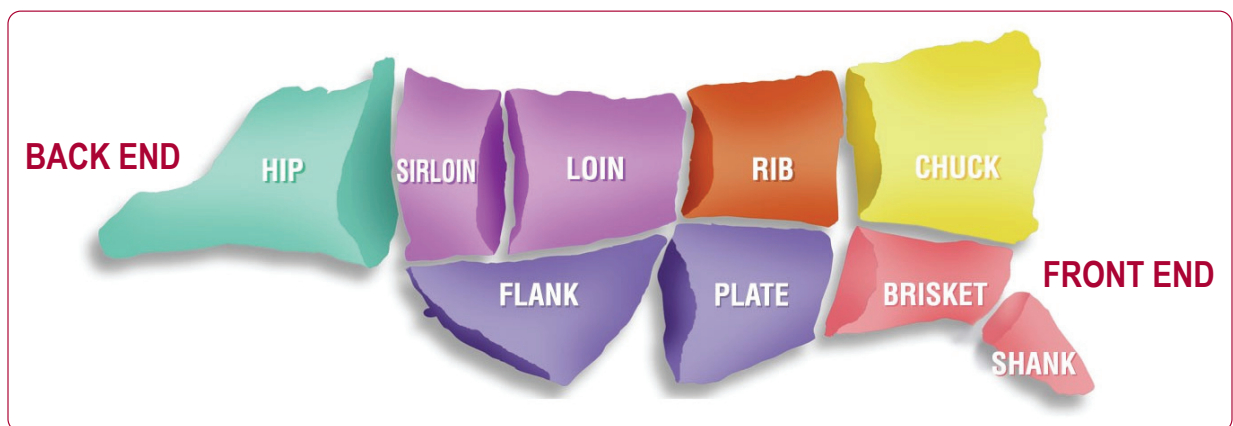
4. Beef Cuts

Beef muscles vary in tenderness depending on where the cut comes from on the carcass. The less the muscles are used, the more tender the meat will be. With more use, the more connective tissue is formed around the muscle, making the meat tougher.

It is important to use the correct preparation, cooking methods and temperatures for different cuts of meat. Each cut of beef can be prepared to produce tender results.

A. Primal Cuts

The carcass is cut into primal cuts, also known as wholesale cuts. These are the cuts that grocery stores and restaurants buy. They are then further cut into smaller pieces called retail cuts.



Memory Tip: To help remember the order of the primal cut, use word association. This will help you remember the order.

"Have some lunch rightly cooked, serve before people faint."

Which really means: Hip, Sirloin, Loin, Rib, Chuck, Shank, Brisket, Plate, Flank

Q. Is there a Shank in the Hip?

A. Yes, there is a Shank in the Hip. The part of the Hip that goes furthest to the right is a Shank. Like the Shank in the front, it has tougher meat. The Hindshank is usually made into ground beef.

B. Retail Cuts

Retail cuts are the cut of meat bought or purchased from the grocery store. The best cooking method will vary with the part of the carcass the retail cut is from. Different parts of the carcass have different amounts of connective tissue. The more connective tissue, the more moisture or tenderizing is needed before or during cooking. This table can help you sort out the amount of connective tissue and the best cooking method.

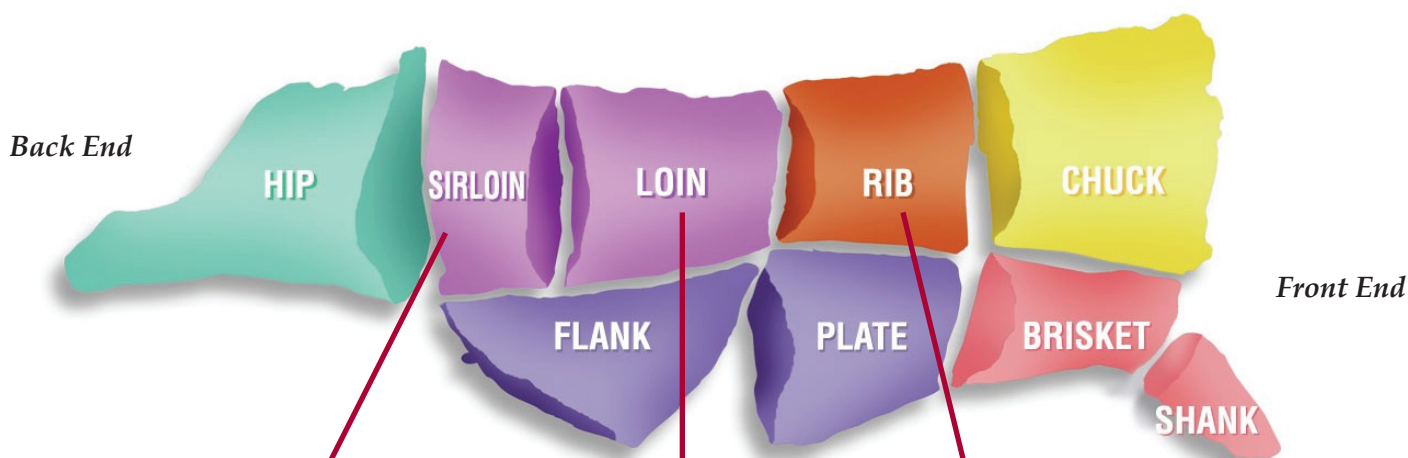
Primal Cut	Amount of Connective Tissue	Best Cooking Method
Rib, Loin, Sirloin	Little	Dry heat cooking (e.g. Grilling)
Hip, Flank	Some	Modified dry heat cooking (e.g. Marinating) or moist heat cooking
Chuck, Shank, Brisket, Plate	Most	Moist heat cooking (e.g. Simmering)





Table 1-3: Connecting Primal Cuts and Connective Tissue with Cooking Methods

The next three pages have examples of primal cuts, where they are from on the carcass and the best cooking method.

Grilling Steaks and Premium Oven Roasts

These cuts come from along the back of the carcass. The Sirloin, Loin and Rib cuts have the least amount of connective tissue. These tender meat cuts require the right cooking techniques to stay tender and have the best beef flavour. Now you can see where the T-Bone Grilling Steak comes from! As the names suggest, **dry heat cooking methods** are the best for “Grilling Steaks” and “Premium Oven Roasts”. Dry heat cooking methods do not soften connective tissue so are best used on cuts with little collagen and elastin. Learn about dry heat cooking methods on pages 1-30 to 1-34.



	Porterhouse Grilling Steak
	T-Bone Grilling Steak
	Wing Grilling Steak
	Tenderloin Premium Oven Roast

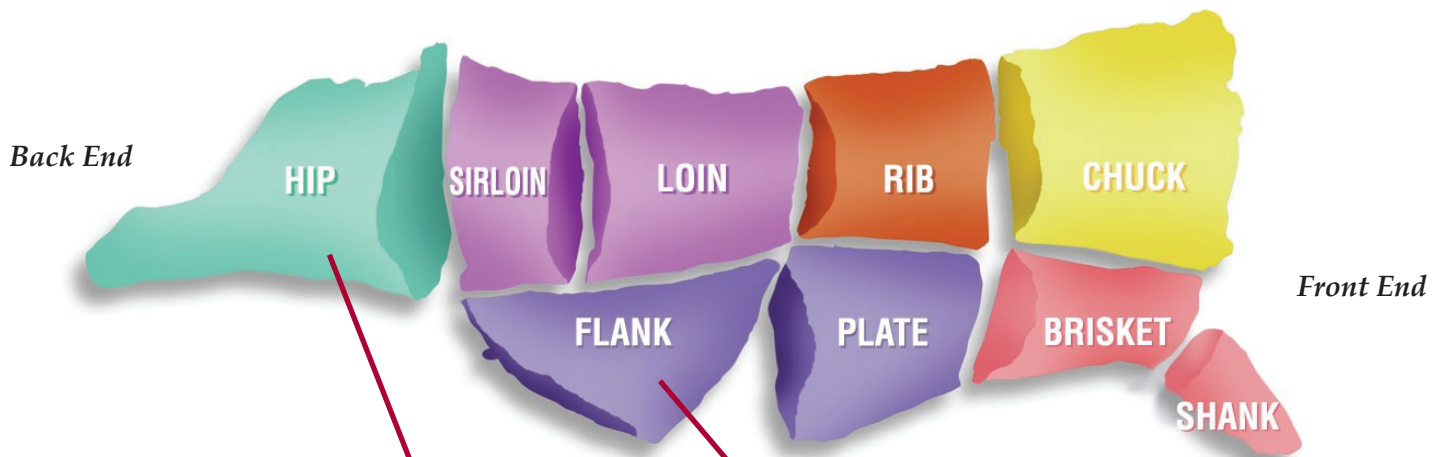
	Rib Eye Grilling Steak
	Rib Eye Premium Oven Roast






...tender meat cont'd

Marinating Steaks & Oven Roasts

These cuts are from Hip and Flank primal cuts. Now you can see where the Rump Oven Roast comes from! These cuts have some connective tissue. With a little preparation, they can be almost as tender as Grilling Steaks or Premium Oven Roasts and for less money. For example, **marinating** a steak before cooking helps break down the connective tissue so it is tender to eat. After marinating, a dry heat cooking method may be used. Cooks with good meat knowledge also know that **moist** heat cooking methods would soften the connective tissue in these cuts.

NOTE: The Sirloin Tip is not part of the Sirloin primal cuts. It is in the Hip next to the Sirloin section on the carcass.

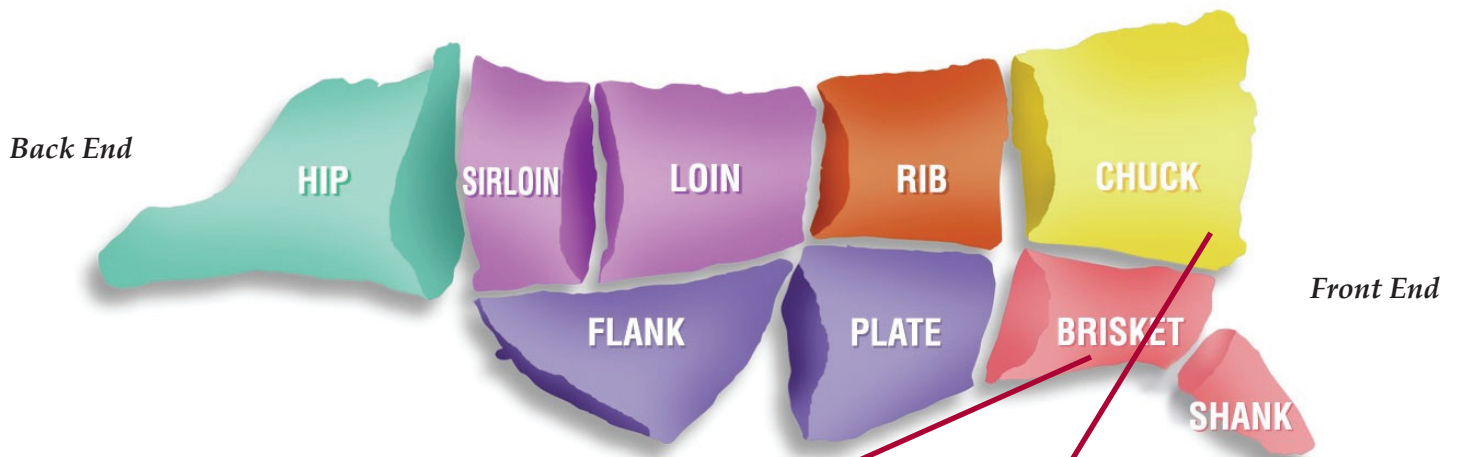




	Sirloin Tip Roast
	Outside Round Marinating Steak
	Rump Oven Roast
	Inside Round Marinating Steak
	Eye of Round Oven Roast




	Flank Marinating Steak
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Simmering Steaks and Pot Roasts

These cuts are from the Chuck, Brisket, Shank and Plate and are the least tender cuts available. Why are they tough? Remember the connective tissue – collagen and elastin? These form in more exercised parts of the carcass. It makes sense if you think what cattle do most of the time...walk and bend down to eat grass. Use **moist heat cooking methods** such as simmering a pot roast to soften the connective tissue. The result is a tender and flavourful beef dish. See pages 1-26 to 1-28 for more information.



	Brisket Pot Roast Boneless
	Stewing Beef

	Cross Rib Pot Roast
	Blade Simmering Steak
	Shoulder Pot Roast

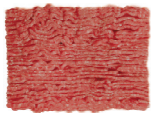
Quick Serve Beef

Retailers understand that many consumers want meats that are ready-to-cook with little extra preparation required. Grilling steaks and some marinating steaks are cut into strips for “read-to-cook” stir fries. Beef from the Hip or Sirloin cuts are cubed for kabobs or fondue.

	Beef Stir Fry Strips
	Sirloin Grilling Cubes

Ground Beef

About 50% of all beef sold in grocery stores is ground beef! This meat may come from Chuck or Shank from Canada A carcasses. For carcasses graded Canada D and E, all of the carcass should be sold as ground beef. Ground beef may be cooked using either a moist or dry cooking method.

	Ground Beef
---	-------------

Tender Meat: The Consumer's Perspective

1. Cooking Methods

The main objective of cooking beef is to have a delicious meal and to have it as tender as possible. This happens when the cook matches the right cooking method to the right cut. There are two types of cooking methods:

- Moist cooking
- Dry cooking

2. Preparation Techniques

Various preparation techniques can be used to help tenderize meat before it is cooked. These include:

- Marinating with acids
- Marinating with enzymes
- Scoring
- Cutting across the grain (which can be done after cooking)
- Pounding
- Grinding

We will discuss cooking methods and preparation techniques in greater detail.



Moist Heat Cooking

Moist heat cooking uses moisture AND a lid. This forms steam during cooking. The steam helps dissolve the collagen connective tissue. This will make the meat more tender. Which type of meat would be best for this cooking technique?

Right! The simmering steaks or pot roast with the most connective tissue. Marinating steaks or oven roasting cuts may also be cooked this way.



Types of Moist Heat Cooking:

1. Stewing

Dip cubes of beef into seasoned flour and brown on all sides in lightly greased pan. Add liquid and seasoning to cover meat. Cover. Simmer until tender. Vegetables may be added for the last half hour. Thicken gravy if desired.

2. Braising

- a. **Oven Braising:** Place roast fat side up in roasting pan. Add approximately 1 cm liquid to pan. Cover. Cook at 160°C (325°F) for 55 min/kg (25 min/lb), adding more liquid if necessary. Remove cover for the last 45 minutes for browning.
- b. **Stove Top Braising:** Brown all sides of the steak or short ribs in a lightly greased pan. Add 215-250ml (1/2 to 1 cup) liquid and seasonings, cover and simmer until tender.

... moist heat cooking cont'd

c. **Pot Roasting:** Brown the roast on all sides in a heavy pan. Add 250 mL (1 cup) liquid and seasoning. Cover. Simmer until tender, adding more liquid if necessary. Vegetables may be added the last half hour.



Summary of Braising Techniques

Oven Braising	Stove Top Braising	Pot Roasting
Done in the oven	Done on the top of the stove	Done either on top of the stove or in the oven
Used for oven roasts	Used for simmering and marinating steaks and short ribs	Used for pot roasts

3. Poaching

A cooking method used for delicate foods like eggs. The food is submerged in water which is about to come to a boil. The surface should shimmer with the possibility of a boil. The challenge is to keep the temperature constant – 70° C to 81° C (160° to 180° F) – at a very low heat. This works best with a burner that can hold very low heat. Meats are very rarely poached.

4. Simmering

A slow cooking method with meat cooked in a liquid. This slow cooking method means the collagen in simmering cuts dissolves, helping to create gravy. A low temperature of 84 to 95° C (185° to 205 F) means that bubbles will be small and slowly rise to the surface.



5. Boiling

For boiling, the fluid is at 100°C (212°F). There will be many bubbles rising to the surface and breaking. This will cook meat quickly and cause the protein to toughen. Have you ever wondered what gave boiled dinners a bad name?

- The more delicate the food, the more gentle the heat.

6. Par Boiling

To par boil, simply boil the meat until most of the fat is removed and is floating on the liquid. It can now easily be skimmed off. Grilling or roasting will follow. This method is mostly done to reduce fat and increase tenderness of the meat. This is a common practice for meats with a high percentage of fat such as spare ribs.

7. Steaming

Meat is placed on a rack on top of boiling water. This is done for a long period until the meat is cooked to your preferred level of doneness. The steam helps break down the connective tissue and tenderize the meat. Beef is not usually steamed, as other cooking methods bring out the best in beef flavour.

8. Basting

The verb “baste” means to moisten meat or other food while cooking. Melted butter or other fat, meat drippings, or liquid such as stock is spooned or brushed on food as it cooks to moisten it. A bulb baster can also be used to drizzle the liquid over the food. Basting adds flavour and colour, and prevents meat from drying out.

From FSIS Food Safety and Inspection Service

Dry Heat Cooking

Dry heat cooking requires no lid or liquid for cooking. Dry heat cooking is typically reserved for meat that is a grilling steak or premium oven roast, which means fewer connective tissue rings to be tenderized. However, it can be used on marinating and oven roast cuts too, if they are first modified to be more like grilling cuts. We'll learn more about that in the next section.

Types of Dry Heat Cooking

1. Roasting/Baking

Put a premium roast in an uncovered pan, fat side up so that the fat can melt and trickle down the roast, which contributes flavour and helps tenderize. Season roast with herbs and spices. If you use salt at all, only use a small amount. Salt tends to dry out meat. Cook, uncovered, until a meat thermometer indicates the preferred level of doneness. This is the best cooking method for premium roasts.

2. Broiling

Consider this to be a “top heat” cooking method. The heat for cooking comes from above the meat. This is done in an oven directly on the top rack which is placed 12cm (5 inches) below the top element. Food is placed on the grilling pan to cook. Water is put in the bottom pan to catch the fat drippings, so there is less mess. The meat must be flipped to cook the other side. A broiler does not have a temperature gauge. You control the heat source by where you place the rack in your oven. A thicker piece of meat is placed further away from the top element to make sure the middle cooks. This is the best method for grilling steaks, hamburgers and pre-marinated cuts from the Hip and Flank.

3. Grilling/Barbecuing

This method is a “bottom heat” cooking method. The heat for cooking comes from below the meat. Food is placed on a metal grill over medium hot coals. To prevent the meat from sticking to the grill, brush the grill with oil. This is the best method for grilling steaks, hamburgers, and pre-marinated cuts from the Hip and Flank.

Helpful Tips on Grilling Steaks:

- Season before cooking. Use a very small amount of salt or no salt. Salt draws out the meat juices
- Use tongs rather than a fork to turn steaks. By not piercing the meat, less juice is lost which means a juicier piece of meat for you
- To keep juices in, turn the meat only once or twice
- Barbecue sauces are best applied toward the end of cooking in order to prevent burning
- To avoid charring further, make sure the grill is as far from the coals as possible
- Check temperature of each steak with a digital food thermometer.

Helpful Tips on Grilling Burgers:

- Defrost ground beef in the refrigerator or in the microwave-NEVER on the counter. Cook ground beef as soon as possible after defrosting, especially if the microwave is used
- Use a gentle touch when shaping ground beef patties. Over-handling will result in a firm compact texture after cooking
- Keep formed patties in the refrigerator for 15 minutes before cooking and they will hold together better
- For juicy burgers, let the burgers cook on one side for 5 min. without pressing down on the burger with a spatula Then turn it over and cook to 71°C (160°F)
- Check temperature of each patty with a digital food thermometer.

4. Frying

This is best for thin tender steaks (fast fry) or ground beef. Frying is done in a fry pan on top of the stove with a small amount of oil to prevent sticking or in a non-stick pan.

5. Sautéing

A small amount of fat is placed in a hot skillet. Meat is added and cooked slowly, uncovered. Food is cooked but not browned. Sautéing is commonly used for stir fry meats and browning ground meat for chili and spaghetti.



6. Pan-broiling

A little fat is placed in a skillet. Meat is added and as it cooks you drain the fat off so the meat does not absorb extra fat. The pan is uncovered. This is good for thin pieces of meat and grill cuts.

7. Pan-frying

Up to 1 cm (1/2 inch) of fat is placed in a skillet. Teflon pans may be used instead with little or no added fat. Breaded meat is added and cooked at low temperatures. The pan is covered. This is good for thick pieces of meat.

8. Searing

Place fat or oil in a very hot skillet and add meat. Meat is browned on all sides in order to seal in juices.

9. Deep-Fat Frying

A large amount of hot oil is placed in an electric fry pan or wok. Food is added and fully submerged into the fat to cook. The oil must be hot enough so the food will not soak up extra fat. If the fat is too hot, the food will over-brown.

Dry Heat Cooking Using Marinating Beef

Dry heat cooking can also be used on marinated meat cuts. There are a couple of things to consider before doing so.

1. Modify the meat to make it more tender using tenderizing techniques.
2. Drain the marinade well so the meat does not boil.
3. Lower your cooking temperature when cooking medium tender roasts.
4. Tenderize prior to dry heat cooking.

Helpful Tips for Determining Doneness

1. Steaks

A. Temperature Method

The number one way to determine steak doneness is a digital food thermometer.

145°F (63°C) - Med-rare

160°F (71°C) - Medium

170°F (77°C) - Well

The following methods for determining doneness are only guidelines:

B. Time Method

BBQ Steak Guidelines

Steak Thickness	Minutes Per Side		
	Rare	Medium	Well-done
1 to 2 cm (½" - ¾")	3-4	4-5	5-6
2.5 cm (1")	4-6	6-7	7-9

C. Touch Method

It will take some practice to turn the following ritual into a practical skill, but soon the touch method will be a way to judge doneness.

Desired Doneness

Rare	Medium	Well-done
Limp Hand	Extended Hand	Fist
Let one hand hang limp. With the index finger of the other hand, push gently into the soft triangle of flesh between the thumb and index finger of the limp hand. It will feel soft and spongy and offer very little resistance. That is how rare steak feels.	Extend your hand palm facing up with the fingers spread. Press the same spot with the index finger of your other hand. The flesh will be slightly resistant and firmer but not hard. That is how a medium steak feels.	Make a fist and press the same spot again. It will snap back quickly, feel very firm and will not have much give. That is how a well done steak feels.

D. Colour

Colour is also an indication of measuring doneness:



- **MEDIUM RARE** – seared with 50% red center
- **MEDIUM** – 25% pink showing
- **MEDIUM WELL** – a slight hint of pink
- **WELL DONE** – broiled until 100% brown

...helpful tips for determining doneness cont'd

2. Hamburgers

To make sure the burger is completely cooked, insert a digital meat thermometer sideways into the center of the hamburger to determine that the internal temperature is 71°C (160°F). At this temperature, bacteria will be killed.

Experts are recommending that colour not be used as a guide of doneness. If ground beef has been thawed in the fridge (as recommended on page 1-7), the meat may look brown throughout cooking. If ground beef includes meat from a bull, it will look pink well past 71°C (160°F). Also, lower fat patties may still be pink. A meat thermometer is the only way of ensuring a hamburger is cooked to a safe temperature.



Ground beef has different recommended cooking temperatures than roast or steak. See page 1-9 to refresh your memory.

3. Roasting

The best way to make sure you don't overcook your roast is to use a meat thermometer to determine doneness.

Tips

- Insert the thermometer into the thickest part of the beef away from fat and bone.
- If the meat thermometer is oven-proof, leave in place as the meat cooks.
- Remove the meat from the oven when the internal heat registers the temperature of the desired doneness.

Using a Meat Thermometer to Determine Roast Doneness

Doneness	Internal Temperature	Roasting Time
Med-rare	63° C / 145° F	18 to 20 min per 500g or pound
Medium	71° C / 160° F	22 to 25 min per 500g or pound
Well-done	77° C / 170° F	30 min per 500g or pound

Get Ready to Tenderize

1. Using Tools to Tenderize

Physically trying to make the meat more tender by breaking elastin (tough connective tissue also known as gristle) into smaller pieces is called mechanically tenderizing. It fools the jaw into thinking the meat is more tender.

- a. **Pounding** the meat with a meat mallet helps soften the elastin, which cannot be softened with moisture.
- b. **Cutting against the grain** shortens muscle fibres into shorter fibres that are easier to chew. The grain is the direction of the long muscle fibres. It also cuts through the connective tissue making it easier for you to chew the meat. Cutting against the grain is used in slicing roasts and steaks for a stir-fry.
- c. **Scoring** the meat is the same as cutting against the grain except you don't cut all the way through the meat. Little slits are made on the surface of the meat. This cuts through some of the connective tissue and also prevents the meat edges from curling. Scoring can be used on simmering steaks.
- d. **Grinding** meat is done with a special machine. This completely breaks up the connective tissue making a simmering cut tender. The most common ground meat is ground beef.
- e. **Cubing** meat into small pieces means cutting through connective tissue and shortening muscle fibres. This helps to tenderize the meat.

2. Kitchen Chemistry

Using a liquid with special ingredients that will help act on the collagen connective tissue to make it more tender is called chemical tenderizing.

- a. **Commercial Tenderizer** (fast acting): These tenderizers have proteolytic enzymes that are able to break down proteins in the meat. Usually the meat should be in such a tenderizer for 30 minutes. Anything longer than 30 minutes will cause the meat to become mushy.
- b. **Marinades:** They can help tenderize and add flavour to any cut of beef. Marinades can have these ingredients:
 - i. An acidic ingredient like lemon juice, orange juice, or tomato sauce or juice. These will break down the collagen around the meat

AND/OR

- ii. fresh fruits with natural enzymes like papaya, pineapple or kiwi. These enzymes will break down the meat and collagen.

Spices are also added for flavouring. Marinating is a slower method than using enzymes. The marinade must be in contact with the meat for at least six to eight hours in the fridge, but ideally 12 to 24 hours is best for steaks or roasts. Kabobs or meat sliced into stir fry-sized pieces can be marinated for three to six hours.

For both of these chemical methods, the tenderizer or marinade works where it touches the meat. It is best to pierce or score the meat all over on both sides with a fork, beforehand. This allows the liquid to better penetrate the muscle fibre.

Some marinate recipes are included in the class recipe book.

Turn on the Heat

There are many reasons why meat is cooked. Cooking:

- increases the flavour
- makes the meat easier to digest
- kills bacteria on the surface, making it safe to eat
- increases the pliability (becomes less chewy)
- softens the collagen
- makes the meat more pleasing to the eye (colour change)

If meat is over-cooked, undesirable traits are created:

- burnt flavour
- tough and dry
- colour is too dark and often black

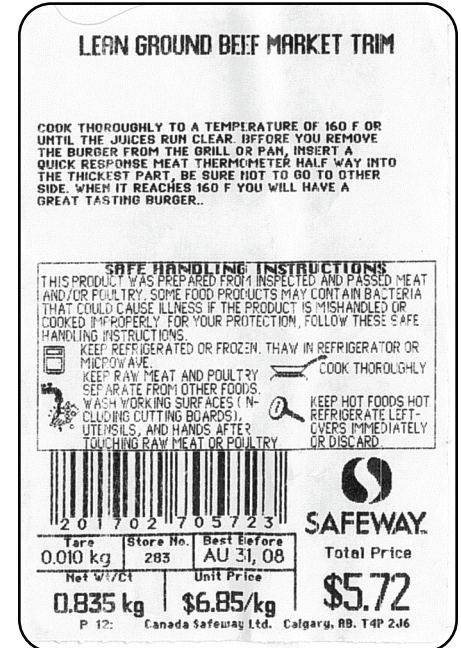
Beef Buying Tips

1. **Check the label:** A new government approved naming system for beef cuts has been designed to make beef shopping and cooking much easier. The appropriate cooking method has been incorporated into the name of the cut to help you prepare each cut of beef correctly, e.g., Eye of Round Marinating Steak.

Also, many retailers are providing cooking instructions for all beef cuts.

Information Found on the Label:

- Name of retail cut
- Cost per kg and total price
- Weight
- Description for the amount of fat (only on ground beef)
- Packaging date or best before date
- Grade (voluntary)
- Cooking instructions (voluntary)



Fat & Lean

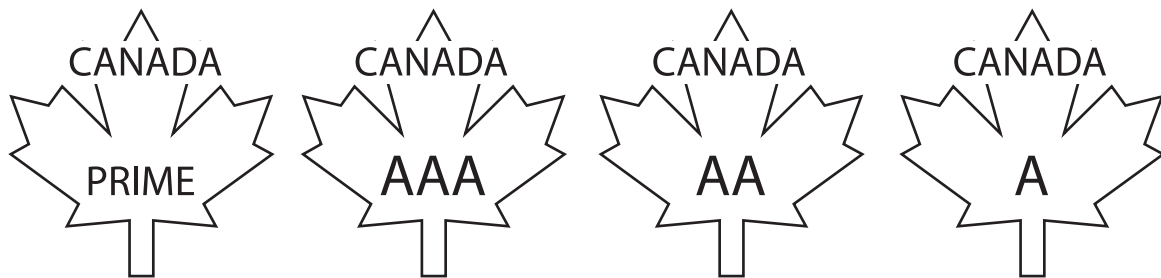
The maximum fat content for ground meats has been set by the federal government.

		Maximum Fat Content
Ground beef	Extra lean ground beef	10%
	Lean ground beef	17%
	Medium ground beef	23%
	Regular ground beef	30%



...beef buying tips cont'd

- 2. Check the grade:** After deciding on the cut of meat, check to see if the meat has a grade on the label. If not available, you can ask the meat cutter for the grade. Grade is an indication of quality. Triple A (AAA) beef has the most marbling and will be very juicy and flavourful. Double A (AA) has slightly less marbling. Single A has trace amounts of marbling.



(Typically sold to restaurants)

- 3. Check the package dating:** If meat is vacuum packed, it will have a **Best Before** date – buy meat that will be cooked or frozen before the Best Before date expires. Meat that is not vacuum packed will have a **Packaged On** date – cook or freeze whole pieces of meat within 2 to 3 days of the Packaged On date or the purchase date. **For ground meat** or small pieces of meat (e.g. strips, cubes), cook or freeze within 1 day of the Packaged On date.

NOTE:

When purchasing meat, use the following guide to estimate how much to buy:

Bone-in: 225 g (1/2 lb) is needed per person for steaks or meat

Boneless: 120 g (1/4 lb) is needed per person for ground beef, boneless roasts, stews or steaks

Remember Eating Well with Canada's Food Guide recommends 2-3 servings of Meat and Alternatives each day for teens aged 14-18. A serving of lean beef is 75 grams cooked.

Healthy Diets with Meat

Lean meats, including beef, help you meet your needs for protein, vitamins, and minerals. Eating well with Canada's Food Guide states leaner meats are one of the Meat & Alternatives choices in a healthy diet. Other healthy choices include grains, vegetables and fruits, and milk products.

Beef is a very nutritious food. **There are 14 essential nutrients.** One serving is 75 grams (2 ½ oz) of cooked lean beef and has:

- √ About half of the protein requirements (for a teen)
- √ Enough vitamin B₁₂ to exceed requirements
- √ An excellent source of zinc and niacin
- √ A source of iron, thiamine, and riboflavin

See page 1-43 for details on what these nutrients do for the body.

The protein in beef is complete, which means all the essential amino acids (protein building blocks) are found in one food.

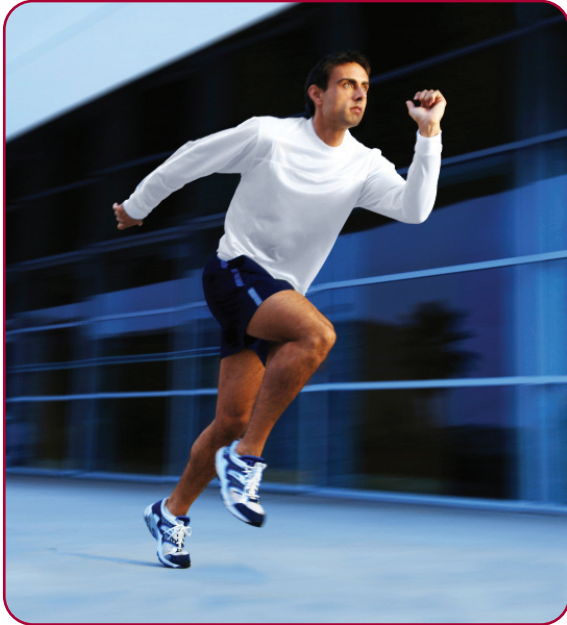
Nutrition Facts	
Per 100 grams lean only, raw Inside Round Marinating Steak	
Amount	% Daily Value
Calories 117	
Fat 2.1 g	3
Saturated 0.7 g + Trans 0.0 g	4
Cholesterol 43 mg	
Polyunsaturated Fat 0.1 mg	
Carbohydrate 0 g	0
Sodium 56 mg	2
Potassium 457 mg	13
Protein 23 g	
Iron 13%	Zinc 41%
Thiamin 8%	Riboflavin 12%
Niacin 38%	Vitamin B₆ 28%
Vitamin B₁₂ 142%	



Lean on Beef

All cuts of beef, trimmed of all visible fat (except short ribs) and lean and extra lean ground beef are part of Health Check™. In order for meat to display the Health Check™ symbol, it must qualify as lean with no more than 10% fat for beef cuts and 17% fat for ground beef. Health Check™ is a retail food information program by the Heart and Stroke Foundation of Canada designed to help Canadians make healthy food choices. For more information about Health Check, see www.healthcheck.org.

Nutrition Facts	
Per 100 grams lean only, raw Lean Ground Beef	
Amount	% Daily Value
Calories 201	
Fat 13.1 g	20
Saturated 5.5 g + Trans 0.5 g	30
Cholesterol 60 mg	
Polyunsaturated Fat 0.4 mg	
Carbohydrate 0 g	0
Sodium 64 mg	3
Potassium 271 mg	8
Protein 20 g	
Iron 13%	Zinc 51%
Thiamin 8%	Riboflavin 14%
Niacin 42%	Vitamin B₆ 13%
Vitamin B₁₂ 120%	



Iron

One nutrient that is very important for everyone is IRON. Some people need to pay particular attention to their iron intake. These are athletes, teenage girls, women and vegetarians.

Our Body and Iron

Iron is an essential part of hemoglobin, a component of red blood cells. Hemoglobin is responsible for picking up oxygen in the lungs and carrying it through the blood stream to all body cells. This oxygen is used in the cells to release energy from the food eaten. Iron is also present in muscle and in some respiratory enzymes. These enzymes help us burn food and oxygen for energy. Iron is stored in the liver, bone marrow and spleen.

Iron: a Common Deficiency

Did you know that 25 to 38% of Canadian teenage girls are iron deficient? Iron deficiency can be picked up by a blood test ordered by a medical doctor. This is the first sign that our bodies are not getting enough iron. If the body doesn't have enough iron, it will not produce enough hemoglobin to move oxygen to the cells. This means less energy is produced in cells and you develop iron deficiency anemia. People with iron deficiency anemia will:

- Be cold, especially their hands and feet
- Be paler than usual
- Be tired and irritable
- Have trouble concentrating (on schoolwork, for example)
- Overall, feel "wiped out"

Pumping Iron...in the Diet

The easiest way to get enough iron is to eat two servings of meat the size and thickness of a deck of cards, each day. Beef has almost three times more iron than the same amount of lighter coloured meats. You can also get iron from enriched cereals and other plant sources (see list page 1-42).

Plants and Animals are Different

Iron is present in foods in two different forms. Animal foods contain "heme" iron, which is more easily absorbed by the body. Plant sources (i.e. vegetables, fruits, and grains) and eggs contain "non-heme" iron, which is NOT absorbed very well. For example, you would have to eat one litre (4 cups) of raw spinach to equal the amount of iron absorbed from one serving (around 75 g) of lean beef.

Iron Sources

Heme	Non-Heme
Beef, pork, veal, lamb	Eggs
Fish (clams, oysters, sardines)	Whole grain cereals
Liver, especially pork	Enriched cereals and pasta
Kidney, Liverwurst	Dark green, leafy vegetables (spinach, beet greens, chard, kale)
Heart	Dried fruits (raisins, dried plums)
Braunschweiger sausage	Iron supplements

Absorbing the Most Iron

1. Eat non-heme iron foods and heme iron foods together.
Examples
 - Beans with tomato sauce and pork
 - Spaghetti with meat sauce
 - Chili con carne with beans and meat
 - Cabbage rolls with meat
2. Eat Vitamin C rich foods with non-heme iron.
Examples
 - An orange with cold cereal
 - Tomato juice with a whole wheat bun
3. Limit tea and coffee. Tea, including iced tea, and coffee can decrease iron absorption. It's best not to drink tea and coffee with meals.

Eating Well with Canada's Food Guide recommends 2 to 3 servings (50 – 100 g each) of Meat and Alternatives each day.

In Conclusion

Beef is a food with ZIP (zinc, iron and protein), many B-vitamins, and energy. This nutrient-dense food is part of a healthy diet.

Nutrients from Beef: Roles in the body

Every bite of delicious Alberta beef is packed with essential nutrients. **There are 14 nutrients in total!** Check out the chart below to find out what they can do for you!

14 Nutrients in Beef	
Protein	<ul style="list-style-type: none"> ◦ Protein from meat contains all 8 ESSENTIAL Amino Acids for growth and repair ◦ Plays a crucial role in ALL biological processes: muscle contraction, immunity, healthy nerve function, hormone production, builds and repairs body tissue ◦ Helps curb your hunger ◦ Builds antibodies (the part of the blood that fights infection)
<i>Vitamins:</i>	
Vitamin B ₁₂	<ul style="list-style-type: none"> ◦ Aids in forming red blood cells ◦ Maintains a healthy nervous system
Vitamin B ₆	<ul style="list-style-type: none"> ◦ Plays a role in protein metabolism ◦ Plays a role in energy production and prevents anaemia
Vitamin D	<ul style="list-style-type: none"> ◦ Helps you absorb and use calcium and phosphorus for strong bones and teeth ◦ Contributes to healthy immune and nervous system function
Niacin	<ul style="list-style-type: none"> ◦ Needed throughout the body for energy production
Thiamine	<ul style="list-style-type: none"> ◦ Converts the carbohydrates you into energy
Riboflavin	<ul style="list-style-type: none"> ◦ Helps our body use energy ◦ Required for effective iron absorption
Pantothenate	<ul style="list-style-type: none"> ◦ Helps our body use energy
<i>Minerals:</i>	
Zinc	<ul style="list-style-type: none"> ◦ Aids in energy metabolism and tissue formation ◦ Aids in growth and development ◦ Helps prevent infections by boosting your immune system
Iron	<ul style="list-style-type: none"> ◦ Combines with protein to form haemoglobin, the part of the red blood cell which transports oxygen ◦ Helps produce energy for body cells ◦ Not all sources of iron are the same. Beef contains a form of iron that is more easily absorbed
Phosphorus	<ul style="list-style-type: none"> ◦ Works with calcium to build and maintain strong teeth and bones ◦ Binds to haemoglobin in red blood cells to effectively deliver oxygen to the body

...nutrients from beef: roles in the body cont'd

Selenium	◦ Is an antioxidant that reduces oxidative damage within the body
Magnesium	◦ Is important in bone function ◦ Is involved in more than 300 essential reactions within your metabolism
Potassium	◦ Helps regulate blood pressure

Fat - Part of a Healthy Diet

Sometimes we hear about fat and all the negative aspects and we often forget that fat is an important nutrient in our diet - we need it for normal body functions. Some fats are essential; meaning, we need to eat them because our body cannot make these fats. It is recommended that an adult's diet have 20-35% total calories from fat.

Did You Know, Fat Is:

- A nutrient
- Provides us with energy
- Adds a wonderful taste and texture to foods
- Makes us feel full longer
- Helps us absorb fat-soluble vitamins like vitamin A, D, E and K

All cuts of beef except short ribs are lean when trimmed of visible fat

"Lean" is:

<10% fat in steaks, roasts, stew meat
<17% fat in ground beef

Ground Beef:

Extra Lean: Max 10% fat

Lean: Max 17% fat

Medium: Max 23% fat

Regular: 30% fat

Beef, Healthy Diets, and a Plan for You

Different people need different amounts of food. See the back side of Eating Well with Canada's Food Guide for the recommended range of servings.

Here are some examples of teens and how they would choose foods for healthy diets which include beef.

Introducing Kevin

He is 16 years old and a competitive swimmer. To meet his nutrient and caloric needs, he usually chooses the maximum number of servings from the four food groups with some "Other" foods. With his high energy and nutrient needs, Kevin sometimes eats more servings than included on the Food Guide.

Grain Products	12
Vegetables and Fruits	10
Milk & Alternatives	4
Meat & Alternatives	3
Others	5+

Breakfast

500 mL bran flakes and raisin cereal with 300 mL milk
1 banana

Snack

Fresh orange
Whole wheat bagel with 15 mL Cream cheese

Lunch

60 g pastrami sandwich with lettuce on 2 slices whole wheat bread; 10 mL margarine and 5 mL mustard
½ green pepper, cut into strips & 50 mL yogourt dip
Apple
250 mL skim milk

Snack

250 mL fruit topped with 50 mL granola and 75 mL yogourt
Water

Dinner

150 g marinated round steak sauté with 250 mL vegetables, 325 mL brown rice with soya sauce
250 mL fresh fruit salad
300 mL milk

Snack

1 med. rice crispy square
Water



Introducing Jenn

She is 16 years old, works part-time at a fast food restaurant and plays basketball. To meet her high nutrient and caloric needs, Jenn eats a higher number of servings from the Four Food Groups and some “Other” foods.

Grain Products	9
Vegetables and Fruits	8
Milk & Alternatives	4
Meat & Alternatives	3
Others	4+

Breakfast

2 slices whole wheat toast
15 mL jam
250 mL milk
200 mL orange juice

Lunch

2 beef fajitas with green & red peppers (75 g flank Steak, 1 c. peppers)
250 mL milk
2 apples

Snack (~4pm)

1 single beef burger
With bun and condiments
Water

Dinner (~8 pm)

Cheese omelette (2 eggs and 30 g cheese)
2 slices whole wheat toast with margarine
1 handful fresh veggies and dip
1 banana
Water

Snack (~10 pm)

2 cups toasted wheat cereal with 200 mL milk



and Introducing Marie

She is a 15 year old and works part-time at the mall after school. Walking to and from school and the mall is her main activity. Marie usually chooses the smallest number of recommended servings to meet her nutrient and caloric needs for growing and her activity.

Grain Products	6.5
Vegetables and Fruits	7
Milk & Alternatives	3
Meat & Alternatives	2
Others	4+

Breakfast

2 cups flaked corn cereal
350 mL milk
250 mL apple juice

Lunch

Tuna sandwich with 50 g tuna, 2 slices whole wheat bread, 15 mL mayonnaise
250 mL tomato juice
2 chocolate chip cookies

Dinner

100 g meatloaf
1 medium baked potato with 15 mL sour cream
125 mL peas with 15 mL salad dressing
350 mL milk

Snack

500 mL popcorn with 10 mL margarine
Water

