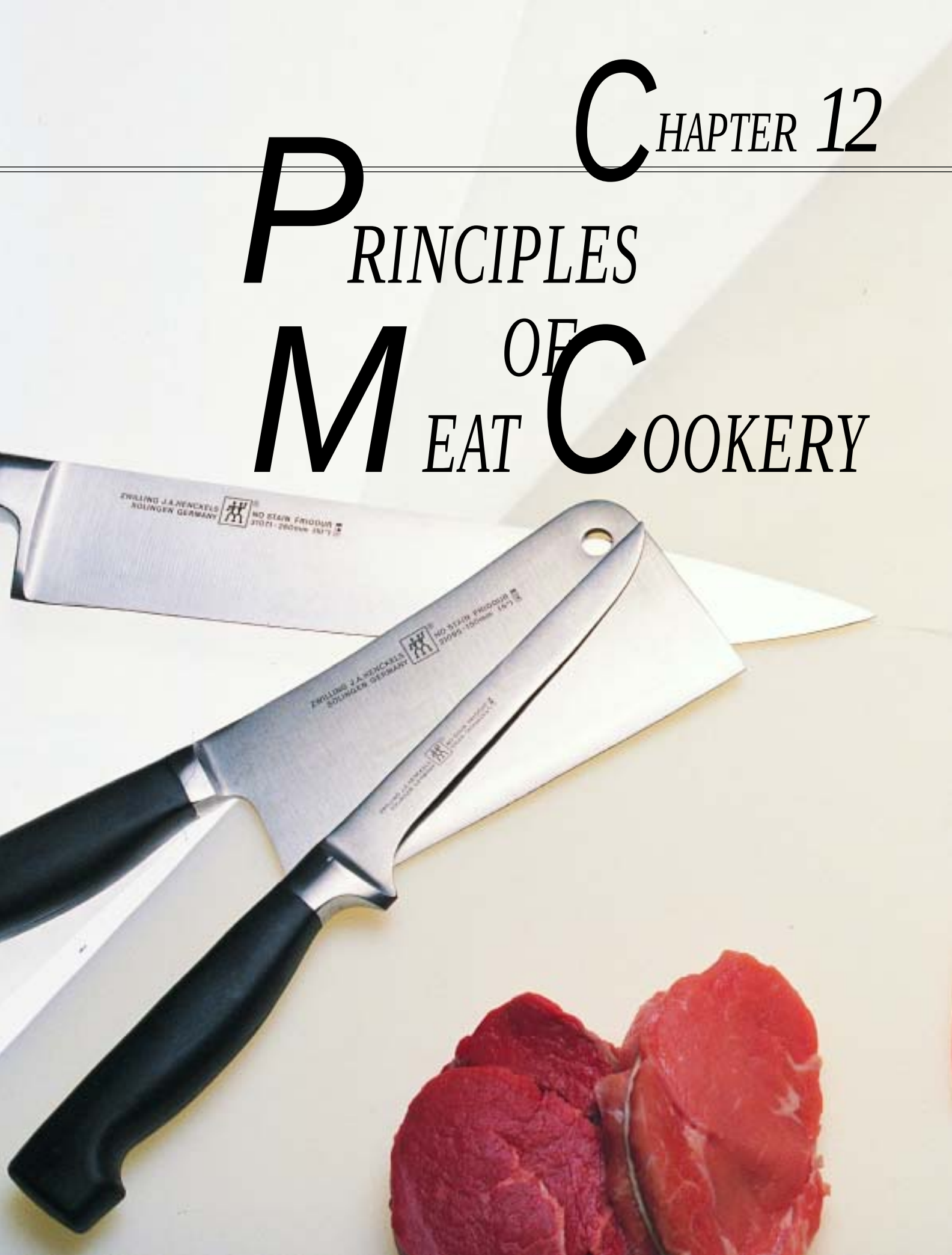
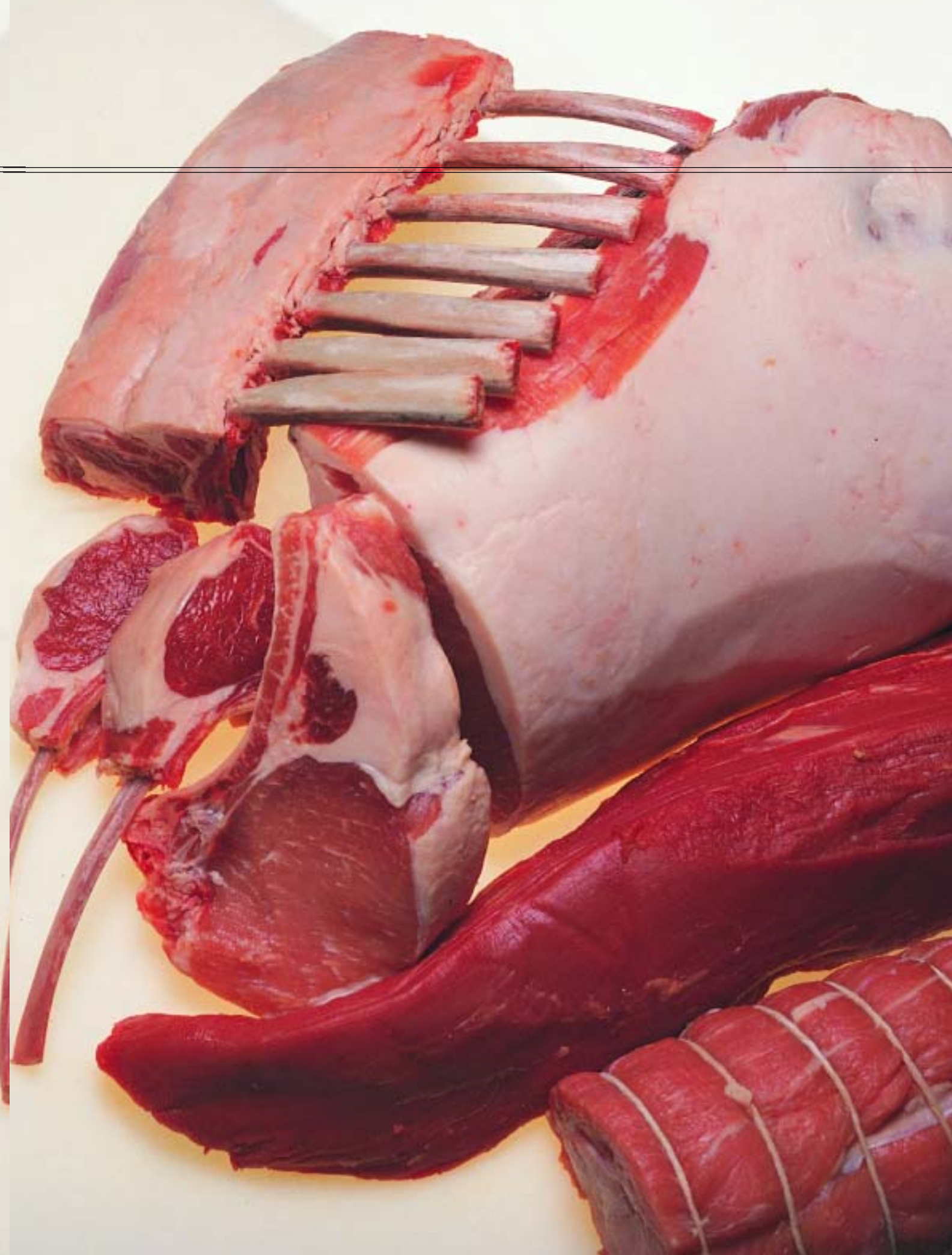
CHAPTER 12

PRINCIPLES OF MEAT COOKERY





LEARNING OUTCOMES

After studying this chapter you will be able to:

- identify the structure and composition of meats
- explain meat inspection and grading practices
- purchase meats appropriate for your needs
- store meats properly
- prepare meats for cooking
- apply various cooking methods to meats: broiling or grilling, roasting, sautéeing, pan-frying, simmering, braising, stewing
- carve a beef hip or leg of lamb

Meats—beef, veal, lamb and pork—often consume the largest portion of your food purchasing dollar. In this chapter we discuss how to protect your investment. You will learn how to determine the quality of meat, how to purchase meat in the form that best suits your needs and how to store it. We also discuss several of the dry-heat, moist-heat and combination cooking methods introduced in Chapter 9, Principles of Cooking, and how they can best be used so that a finished meat item is appealing to both the eye and palate. Although each of the cooking methods is illustrated with a single beef, veal, lamb or pork recipe, the analysis is intended to apply to all meats.

In Chapters 13 through 16 you will learn about the specific cuts of beef, veal, lamb and pork typically used in food service operations, as well as some basic butchering procedures. Recipes using these cuts and applying the various cooking methods are included at the end of each of those chapters.

Muscle Composition

The carcasses of cattle, sheep, hogs and furred game animals consist mainly of edible lean muscular tissue, fat, connective tissue and bones. They are divided into large cuts called **primals**. Primal cuts are rarely cooked; rather, they are usually broken down to **subprimal cuts** which, in turn, can be cooked as is or used to produce **fabricated cuts**. For example, the beef primal known as a short loin can be divided into subprimals including the strip loin. The strip loin can be fabricated into other cuts including strip loin steaks. The primals, subprimals and fabricated cuts of beef, veal, lamb and pork are discussed in Chapters 13 through 16, respectively; game is discussed in Chapter 18.

Muscle tissue gives meat its characteristic appearance; the amount of connective tissue determines the meat's tenderness. Beef muscle tissue is approximately 72% water, 20% protein, 7% fat and 1% minerals. A single muscle is composed of many bundles of muscle cells or fibres held together by connective tissue. (See Figures 12.1 and 12.2.) The thickness of the cells, the size of the cell bundles and the connective tissues holding them together form the grain of the meat and determine the meat's texture. When the fibre bundles are small, the meat has a fine grain and texture. Grain also refers to the direction in which the muscle fibres travel. When an animal fattens, some of the water and proteins in the lean muscle tissue are replaced with fat, which appears as **marbling**.

Connective tissue forms the walls of the long muscle cells and binds them into bundles. It surrounds the muscle as a membrane and also appears as the tendons and ligaments that attach the muscles to the bone. Most connective tissue is composed of either **collagen** or **elastin**. Collagen breaks down into water-soluble gelatin when cooked using moist heat. Elastin, on the other hand, will not break down under normal cooking conditions. Because elastin remains stringy and tough, tendons and ligaments should be trimmed away before meat is cooked.

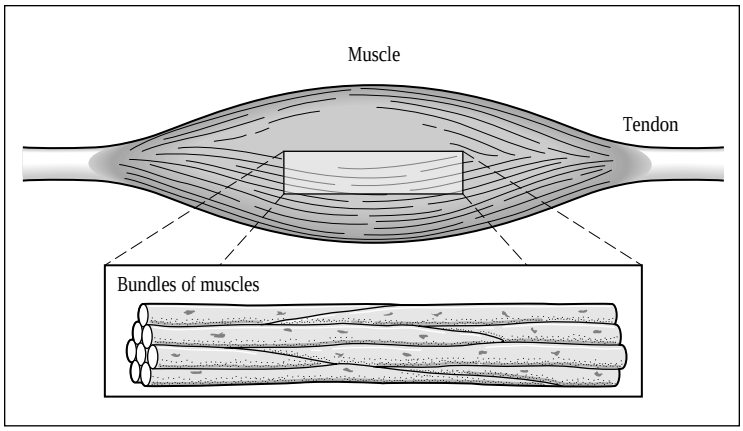


FIGURE 12.1 *Muscle Tissue*

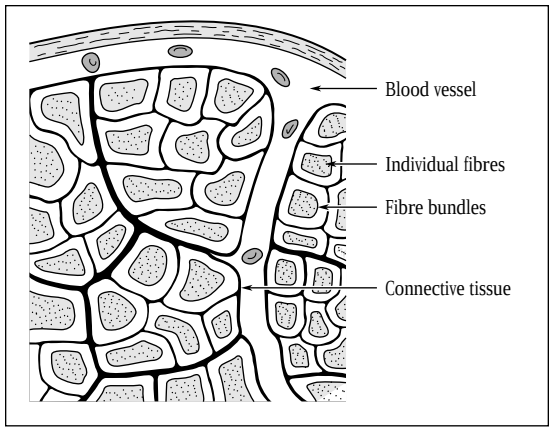


FIGURE 12.2 *Crosscut of a Bundle of Muscle Fibres*

Connective tissue develops primarily in the frequently used muscles. Therefore, cuts of meat from the shoulder (also known as the chuck), which the animal uses constantly, tend to be less tender than those from the back (also known as the loin), which are used less frequently. As an animal ages, the collagen present within the muscles becomes more resistant to breaking down through moist-heat cooking. Therefore, the meat of an older animal tends to be less tender than that of a younger one.

NUTRITION

Although nutritional content of beef, veal, pork and lamb differs, generally, all are high in protein, saturated fats and cholesterol. Consumed in moderate quantities, however, meat can be part of a healthful diet.

INSPECTION AND GRADING OF MEATS

Inspection

All meat produced for public consumption in Canada is subject to health inspection under the supervision of the Canadian Food Inspection Agency. Inspections ensure that products are processed under strict sanitary guidelines and are wholesome and fit for human consumption. Inspections do not indicate a meat's quality or tenderness. Whole carcasses of beef, pork, lamb and veal are labelled with a round stamp, which also identifies the processing facility. See Figure 12.3. The stamp shown in Figure 12.3 is also used for fabricated or processed meats and is found on either the product or its packaging. Imported products must also be inspected. The revised Canada Food Inspection System (CFIS) was implemented in 1998.

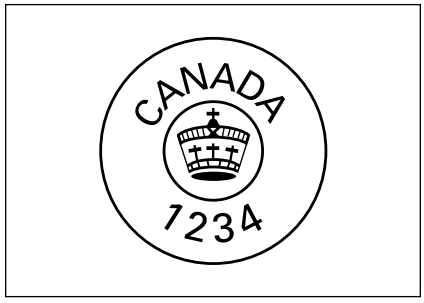


FIGURE 12.3 *Canada Meat Inspection Stamp*

Grading

Canadian grading provides a voluntary, uniform system by which producers, distributors and consumers can measure differences in the quality of meats and make price/quality comparisons. There are two parts to this grading system: quality grades and yield assessments. (See Figures 12.4 and 12.5.)

A HISTORY OF MEAT REGULATIONS

1929: First beef grading policy inaugurated. Jointly proposed by producer, trade and governments, it was based on the belief that beef of good eating quality should be identified by branding and grading.

1941: All beef sold to the Department of National Defence had to be grade stamped. One year later, all beef to be branded had to be graded and stamped by official graders.

1947: National beef grading regulations were passed into law.

1958: Beef and veal grading regulations were revised under the Canada Agricultural Products Standards Act. Grade discriptions reflected consumer demand for leaner beef.

1972: New beef grading system adopted. Based in part on partial ribbing and measurement of fat thickness only with some visual appraisal of rib eye muscle size and quality.

1984: Ribbing site relocated to between the twelfth and thirteenth ribs. Minimum carcass weight reintroduced. Metric measures introduced.

1988: Canada Agricultural Products Act proclaimed. Regulated marketing of agricultural products in import, export, interprovincial trade and provincial national standards and grades.

1992: Grade names changed and marbling criteria used to be in harmony with USDA. Yield grades and stamps refined.

1995: Beef and poultry regulations amalgamated.

Late 1990s: Grading privatized, Canadian Food Inspection Agency created, Canada Prime grade added to beef system. HACCP legislated for federal plants. Computer Vision System developed.

FIGURE 12.4 *Grade Stamp for Canada AAA Beef*

FIGURE 12.5 *Yield Stamp*

Quality grades, provided and paid for by the industry, group meats of similar quality, yield and value.

Grading takes into account five factors:

1. The animal's age determined by the degree of bone ossification.
2. The colour of the meat.
3. The conformation of the muscling.
4. The fat colour.
5. The sex of the animal.

For beef, the intramuscular fat or marbling is taken into account also. It is assessed on the rib eye at the quarter break. For example, beef graded A or better must have at least "traces to slight" marbling and "good with some deficiency to excellent" muscling.

A Computer Vision System (CVS) uses cameras to assist in carcass sorting. The rib-eye camera takes a digitized picture of the rib eye. The computer software analyzes the marbling and could assist in grade assignment. The second camera takes a picture of the whole carcass and combines the information with the rib-eye scan. A yield score is calculated that provides an estimate of saleable yield. Testing has shown the computer-generated yield score to be twice as accurate as the yield ruler. A grader still assesses the final grade. Processors are using the CVS to differentiate the sub-levels within Prime and AAA.

Carcass pasteurization is performed in large processing plants. The process involves three steps: removing water left on the carcass surface by the final wash, exposing the carcass to a hot-water or steam blanket and quickly chilling the carcass surface with a cold-water shower. A special chamber is used for the process.

Beef: Canada has a well-defined beef grading system with A or higher being the best. The main grades are Canada Prime, AAA, AA, A, B1, B2, B3, B4, D and E grades. Approximately 82% (1999) of Canadian beef production is A grade or higher, and Canada Prime represents 1% of production. Systems are being developed to reward producers of higher grade meat.

Veal: There are currently 10 grades of veal in Canada with A1, A2, A3 and A4 being the highest. Criteria include muscle conformation, flesh colour and fat deposits. Grading is carried out for the producer but consumers generally purchase based on colour (white to pink). Grading does not differentiate between milk- and grain-fed animals except in Quebec, where "milk-fed" is a regulated term. For menu terminology, the term "veal" is generally used, but if you specify "milk-fed" then you must have invoices to support your

claim. "Baby beef" is not a recognized term, although "calf" is often used to describe veal liver. Graded carcasses are grade stamped. The minimum weight for a hide-off carcass is 80 kg (176 lb.) and the maximum is 160 kg (352 lb.). An ungraded veal carcass may weigh up to 180 kg (396 lb.) hide-off. The animal is generally a minimum of two weeks old.

Pork: Pork grading is mainly done for the hog producer and for export. Domestic consumption does not show a grade stamp. The producer is paid according to the fat-to-lean ratio and most pork is trimmed at the plant. Of the 12 grades, Canada Yield Class is the most desirable. The carcass weighs 40 kg (88 lb.) or more and the yield percentage, by probe, of lean to fat on the loin meat must be between 54.7% and 64.3% or higher.

Sheep: Most sheep are marketed as spring lamb or genuine spring lamb. Older sheep are generally processed into value-added products. Spring lamb is 5–12 months old and weighs 13.5–29.5 kg (30–65 lb.). The fat will be white and the flesh dark pink. The following characteristics are assessed and scored on a matrix grading: the appearance of the break joint, the yield, the fat level, the muscling, the colour of the pectoral muscle and the colour of the fat. For example, muscling is rated on a scale of 1 to 5 with M5 being the highest. Grading is done primarily for the producer as most lamb is sold ungraded.

Yields and Grades

Yield assessments measure the amount of usable meat (as opposed to fat and bones) on a carcass and provide a uniform method of identifying differences among carcasses. Yield assessments are critical to producers and purveyors alike. Producers of hogs are paid more for higher-yield carcasses. Purveyors and retailers want high-yield carcasses in order to reduce trim costs and increase profitability. Beef and pork are the carcasses with well-defined yield assessment criteria.

Grading of meats is a voluntary program paid for by the processing industry. Ungraded meat products can be purchased; however, consumers are willing to pay a premium for the assurance of graded, top-quality products. The development of private labelling systems by industry is growing, but these private systems do not necessarily conform to Agriculture Canada's regulations and can be a source of confusion to the consumer. Ask clear, directed and concise questions of your purveyor to ensure you are getting the product you require. Roller branding is only required for carcasses leaving the slaughter facility to be processed elsewhere.

Aging Meats

When animals are slaughtered their muscles are soft and flabby. Within 6 to 24 hours rigor mortis sets in, causing the muscles to contract and stiffen. Rigor mortis dissipates within 48 to 72 hours under refrigerated conditions. All meats should be allowed to rest, or age, long enough for rigor mortis to dissipate completely. Meats that have not been aged long enough for rigor mortis to dissipate, or that have been frozen during this period, are known as "green meats." They will be very tough and flavourless when cooked. Current research verifies that aging contributes to the tenderness of beef. Little benefit is realized past 14 days. Marbling accounts for less than 5% of tenderness.

Typically, initial aging takes place while the meat is being transported from the slaughterhouse to the supplier or food service operation. Beef and lamb are sometimes aged for longer periods to increase their tenderness and flavour characteristics. Pork is not aged further because its high fat content turns rancid easily, and veal does not have enough fat to protect it during an extended aging period.

Wet Aging

Today, most pre-portioned or precut meats are packaged and shipped in vacuum-sealed plastic packages, for example, Cryovac®. Wet aging is the process of storing vacuum-packaged meats under refrigeration for up to 6 weeks. This allows natural enzymes and microorganisms time to break down connective tissue, which tenderizes and flavours the meat. As this chemical process takes place, the meat develops a slight off odour that is released when the package is opened and dissipates in a few minutes. Bag aging generally results in a yield loss of only 1–2%, significantly lower than dry (air) aging. A liquid called purge will be in the bag. Beef generally has the greatest capacity for aging. Exercise caution with the length of time. Most other meats must be used within a shorter time frame. Commercially vacuum-packaged and chilled pork, for example, has a shelf life of about 21 days.

A TENDER HISTORY

In *Food in History*, Reay Tannahill suggests that prehistoric hunters developed weapons and stealth tactics in order to kill their quarry without alerting it to danger and provoking fright, fight or flight. She notes that muscle tissues from animals that die placidly contain glycogen. At death, glycogen breaks down into various substances including lactic acid, a natural preservative. Animals experiencing fright, fight or flight just before death, however, use up their glycogen. Tannahill theorizes that prehistoric hunters recognized and responded to what science much later confirmed: Meat from animals that die peacefully is sweeter and more tender.

Dry Aging

Dry aging is the process of hanging fresh meats in an environment of controlled temperature, humidity and air flow for up to four weeks. This allows enzymes and microorganisms to break down connective tissues. Dry aging is actually the beginning of the natural decomposition process. Dry aged meats can lose from 5% to 20% of their weight through moisture evaporation. Moisture loss combined with additional trimming can substantially increase the cost of dry aged meats. Dry aged meats are generally available only through smaller distributors and specialty butchers.

Irradiation

This process is pending (2001) approval for use in Canada. Other countries are irradiating meats and produce to increase shelf life by inhibiting the growth of some bacteria by altering the water activity (A_W) of the product. Changing the molecular structure of the water restricts microbial growth.

PURCHASING AND STORING MEATS

Several factors determine the cuts of meat your food service operation should use:

1. Menu—The menu identifies the types of cooking methods used. If meats are to be broiled, grilled, roasted, sautéed or fried, more tender cuts should be used. If they are to be stewed or braised, cuts with more connective tissue can be used to produce flavourful dishes.
2. Menu price—Cost constraints may prevent an operation from using the best quality meats available. Generally, the more tender the meat, the more expensive it is. But the most expensive cuts are not always the best choice for a particular cooking method. For example, a beef tenderloin is one of the most expensive cuts of beef. Although excellent grilled, it will not necessarily produce a better braised dish than the less tender chuck.
3. Quality—Often, several cuts of meat can be used for a specific dish, so each food service operation should develop its own quality specifications.

PACKAGING

Meat and other products may be sealed in a gas-filled package. Controlled atmosphere packaging (CAP) involves adding or removing gases to maintain a desired balance. The storage vessel is impermeable. Modified atmosphere packaging (MAP) means to enclose the product in a barrier and modify the atmosphere by drawing a vacuum or introducing a gas mixture. Respiration of the product and permeability of the film will affect the level of the gases during storage. Depending on the type of product, oxygen, nitrogen or carbon dioxide may be used to achieve the desired outcome. Vacuum-packaged primals can have a shelf life of 10–12 weeks at temperatures near 0°C (32°F).

Purchasing Meats

Once you have identified the cuts of meat your operation needs, you must determine the forms in which they will be bought. Meats are purchased in a variety of forms: whole, sides, quarters, primal cuts or portion cuts (known as portion control or PC) ready to cook and serve. You should consider the following when deciding how to purchase meats:

1. Employee skills—Do your employees have the skills necessary to reduce large pieces of meat to the desired cuts?
2. Menu—Can you use the variety of bones, meat and trimmings that result from fabricating large cuts into individual portions?
3. Storage—Do you have ample refrigeration and freezer space so that you can be flexible in the way you purchase your meats?
4. Cost—Considering labour costs and trim usage, is it more economical to buy larger cuts of meat or PC units?

CMC/IMPS

The Canadian Meat Council (CMC) publishes full-colour manuals that name and number cuts of meat. The United States Department of Agriculture (USDA) publishes Institutional Meat Purchasing Specifications (IMPS). The CMC/IMPS system is a widely accepted and useful tool in preventing miscommunications between purchasers and purveyors. Meats are indexed by a numerical system: Beef cuts are designated by the 100 series, lamb by the 200 series, veal by the 300 series, pork by the 400 series, and portion cuts by the 1000 series. Commonly used cuts of beef, veal, lamb and pork and their CMC/IMPS numbers, as well as applicable cooking methods and serving suggestions, are discussed in Chapters 13 through 16. However, there are numbering differences in some cases and it is important to communicate clearly with your supplier to ensure the correct product is ordered and received.

Storing Meats

Meat products are highly perishable, so temperature control is the most important thing to remember when storing meats. Fresh meats should be stored at temperatures of –1°C to +2°C (30°F–35°F). Vacuum-packed meats should be left in their packaging until they are needed. Under proper refrigeration, vacuum-packed meats with unbroken seals have a shelf life of three to four weeks. If the seal is broken, shelf life is reduced to only a few days. Meats that are not vacuum packed should be loosely wrapped or wrapped in air-permeable paper. Do not wrap meats tightly in plastic wrap, as this creates a good breeding ground for bacteria and will significantly shorten a meat's shelf life. Store meats on trays and away from other foods to prevent cross-contamination.

Meats freeze at about –2°C (28°F). When freezing meats, the faster the better. Slow freezing produces large ice crystals that tend to rupture the muscle tissues, allowing water and nutrients to drip out when the meat is thawed. Most commercially packaged meats are frozen by blast freezing, which quickly cools by blasting –40°C (–40°F) air across the meat.

The ideal temperature for maintaining frozen meat is –45°C (–50°F). Frozen meat should not be maintained at any temperature warmer than –18°C (0°F). Moisture- and vapourproof packaging will help prevent **freezer burn**. The length of frozen storage life varies with the species and type of meat. As a general rule, properly handled meats can be frozen for up to six months. Frozen meats should only be thawed at refrigerator temperatures, not at room temperature or in warm water.

Preparing Meats

Certain procedures are often applied to meats before cooking to add flavour and/or moisture, or to enhance tenderness. These include marinating, barding, larding, jacquarding, tumbling and needling.

Marinating—Wet and Dry

Wet marinating is the process of soaking meat in a seasoned liquid to flavour and tenderize it. Marinades can be simple blends (herbs, seasonings and oil) or a complicated cooked recipe (red wine, fruit and other ingredients). Mild marinades should be used on more delicate meats, such as veal. Game and beef require strongly flavoured marinades. In wine-based marinades, white

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Jacquarding, Tumbling and Needling

Jacquarding—a process of piercing muscle tissue with needles to tenderize.

Tumbling—a process in which solid muscle meat is tumbled with crushed ice and/or a seasoned liquid until the meat absorbs a prescribed percentage of its weight in liquid. An emulsifier may be added or a vacuum used to promote faster, more complete absorption. The tumbling "releases" the protein and allows the liquid to emulsify with the fat in the muscle fibres. There are strict regulations governing the types of meats that may be tumbled (or pumped) and the allowable levels of moisture added. Sold as "seasoned" product or "water added."

Needling—a process in which a solution is injected into the muscle to provide moisture and flavour. Products are referred to as marinated or enhanced. The moisture retention must be declared.

Barding a Pheasant

Larding Meat

wine is usually used for white meats and red wine for red meats. Not only does the wine add a distinctive flavour, the acids in it help break down connective tissues and tenderize the meat.

Veal and pork generally require less time to marinate than game, beef and lamb. Smaller pieces of meat take less time than larger pieces. When marinating meat, be sure to cover completely and keep it refrigerated. Stir or turn the meat frequently to ensure that the marinade penetrates evenly.

Dry marinating generally involves rubbing herbs and spices into the surface of the meat, fish, poultry or game. Dry rubs may have sugar and salt in them as well, although both may draw moisture out of the product. Depending on the concentrations of salts and the use of nitrates and nitrites, dry marinating can become a form of curing. The product may be placed on a rack and sometimes is pressed as it undergoes the marinating process.

Barding

Barding is the process of covering the surface of meat or poultry with thin slices of pork backfat or bacon and tying them in place with butcher's twine. Barded meat or poultry is usually roasted. As the item cooks, the backfat continuously bastes it, protecting the meat from drying and enhancing moistness. A drawback to barding is that the backfat prevents the meat or poultry from developing the crusty exterior associated with roasting.

Larding

Larding is the process of inserting small strips of pork fat into meat with a larding needle to imitate marbling. Larded meat is usually cooked by braising. During cooking, the added fat melts and coats the meat fibres contributing to moistness. Although once popular, larding is rarely used today because advances in feeding practices and selective breeding produce better marbled meats.

Applying Various Cooking Methods

Dry-Heat Cooking Methods

Dry-heat cooking methods subject food directly to the heat of a flame (broiling and grilling), hot air (roasting) or heated fat (sautéing and pan-frying). These cooking methods firm proteins without significant breakdown of connective tissue. They are not recommended for less tender cuts or those high in connective tissue.

Broiling and Grilling

To serve a good-quality broiled or grilled product you must start with good-quality meat. The broiling or grilling process adds flavour; additional flavours are derived from seasonings. The broiler or grill should brown and sear the meat for flavour and appearance. The grill should leave distinctive crosshatch marks on the meat's surface.

Selecting Meats to Broil or Grill

Only the most tender cuts should be broiled or grilled because the high heat and short cooking times do not tenderize. Intramuscular fat adds flavour

as the meat cooks, so the meat should be well marbled. Some external fat is also beneficial. Too much fat, however, will cause the broiler or grill to flare up, burning or discolouring the meat and adding objectionable flavours. Silverskin (elastin) toughens when meat is broiled or grilled. Trim away as much of it as possible.

Cooking Temperatures

Red meats should be cooked at sufficiently high temperatures to caramelize their surface, making them more attractive and flavourful. At the same time, the broiler or grill cannot be too hot or the meat's exterior will burn before the interior is cooked.

Because veal and pork are normally cooked to higher internal temperatures than beef and lamb, they should be cooked at slightly lower temperatures so the exterior is a deep golden colour while the interior is cooked to the desired doneness, but still moist.

Seasoning Meats to Be Broiled or Grilled

Meats that have not been marinated should be well seasoned with salt and pepper just before being placed on the broiler or grill. If they are seasoned and allowed to rest, the salt will dissolve and draw out moisture, making it difficult to brown the meat properly. Some chefs feel that broiled or grilled meats should be seasoned on the cooked surface only. Pork and veal, which have a tendency to dry out when cooked, should be basted with seasoned butter or oil during cooking to help keep them moist. Meats can be glazed or basted with sauces or marinade liquids as they cook, but observe food safety guidelines and excercise caution with high-sugar products that may burn.

Degrees of Doneness

Consumers request and expect meats to be properly cooked to specific degrees of doneness. It is your responsibility to understand and comply with these requests. Meats can be cooked very rare (or bleu), rare, medium rare, medium, medium well or well done. Figure 12.6 shows the proper colour for these different degrees of doneness. This guide can be used for red meats cooked by any method.

Larger cuts of meat, such as a chateaubriand or thick chops, are often started on the broiler or grill to develop colour and flavour and then finished in a low heat oven to ensure complete, even cooking.

Determining Doneness

Broiling or grilling meat to the proper degree of doneness is an art. Larger pieces of meat will take longer to cook than smaller ones, but how quickly a piece of meat cooks is determined by many other factors: the temperature of the broiler or grill, the temperature of the piece of meat when placed on the broiler or grill, the type of meat and the thickness of the cut. Because of these variables, timing alone is not a useful tool in determining doneness.

A thermometer is the most reliable method of determining doneness; however, its use is not very practical or accurate with cuts such as steaks. Cutting a steak to observe the colour is not acceptable to the customer. The most used method of determining doneness is by pressing the piece of meat with tongs and gauging the amount of resistance it yields. Very rare (bleu) meat will offer almost no resistance and will feel almost the same as raw meat. Meat cooked rare will feel spongy and offer slight resistance to pressure. Meat cooked medium will feel slightly firm and springy to the touch. Meat cooked well done will feel quite firm and will spring back quickly when pressed. See Table 12.1.

Catch: new Figure 12.6

FIGURE 12.6 *Degrees of Doneness Beef roasted rare, medium rare, medium and medium well.*

1. Brush the lamb chops with oil.

2. Place the lamb chops on the grill.

3. Rotate the lamb chops 90 degrees to create crosshatch marks.

4. Turn the chops over to finish them on the other side.

TABLE 12.1 DETERMINING DONENESS OF BEEF STEAK

Degree of Doneness	Colour	Degree of Resistance
Very rare (bleu)	Very red and raw-looking centre (the centre is cool to the touch)	Almost no resistance
Rare	Large deep red centre	Spongy; very slight resistance
Medium rare	Bright red centre	Some resistance; slightly springy
Medium	Rosy pink to red centre	Slightly firm; springy
Medium well	Very little pink at the centre, almost brown throughout	Firm; springy
Well done	No red	Quite firm; springs back quickly when pressed

Accompaniments to Broiled and Grilled Meats

Because a broiler or grill cannot be deglazed to form the base for a sauce, compound butters or sauces such as béarnaise are often served with broiled or grilled meats. Brown sauces such as bordelaise, chasseur, périgueux or brown mushroom sauce also complement many broiled or grilled items. Additional sauce suggestions are found in Table 10.5.

Basic Procedure for Broiling or Grilling Meats

1. Heat the broiler or grill.
2. Use a wire brush to remove any charred or burnt particles that may be stuck to the broiler or grill grate. The grate can be wiped with a lightly oiled towel to remove any remaining particles and help season it.
3. Prepare the item to be broiled or grilled by trimming off excess fat and connective tissue and marinating or seasoning as desired. The meat may be brushed lightly with oil to help keep it from sticking to the grate, but excess fat will cause flare-ups.
4. Place the item in the broiler or on the grill. Following the example in Chapter 9, turn the meat to produce the attractive crosshatch marks associated with grilling. Use tongs to turn or flip the meat without piercing the surface in order to prevent valuable juices from escaping.
5. Cook the meat to the desired doneness while developing the proper surface colour. To do so, adjust the position of the meat on the broiler or grill or adjust the distance between the grate and heat source.

Applying the Basics

RECIPE 12.1

GRILLED LAMB CHOPS WITH HERB BUTTER

Yield: 2 Servings

Lamb chops, loin or rib, approx. 2.5 cm (1 inch) thick	6	6
Salt and pepper	TT	TT
Oil	as needed	as needed
Herb butter	6 thin slices or	6 small rosettes

1. Preheat the grill for 15 minutes or until the grate is sufficiently heated.
2. Season the lamb chops with salt and pepper; lightly brush with oil.
3. Place the lamb chops on the grill, turning as necessary to produce the proper crosshatching. Cook to the desired doneness.
4. Remove the lamb chops from the grill and place a slice or rosette of herb butter on each chop.
5. Serve immediately as the herb butter melts. The plate can be placed under the broiler for a few seconds to help melt the herb butter.

RECIPE 12.1

Approximate values per serving:

Calories	524
Total fat	44 g
Saturated fat	20 g
Cholesterol	161 mg
Sodium	368 mg
Total carbohydrates	0.1 g
Protein	32 g

Roasting

Properly roasted meats should be tender, juicy and evenly cooked to the appropriate degree of doneness. They should have a pleasant appearance when whole as well as when sliced and plated.

Seasoning Meats to Be Roasted

Seasonings are especially important with smaller roasts and roasts with little or no fat covering. With these roasts, some of the seasonings penetrate the meat while the remainder help create the highly seasoned crust associated with a good roast. A large roast with heavy fat covering (for example, a ponderosa hip or prime rib) does not benefit from being seasoned on the surface because the seasonings will not penetrate the fat layer, which is trimmed away before service.

When practical, a roast with excess fat should be trimmed, leaving just a thin fat layer so that the roast bastes itself while cooking. A lean roast can be barded or larded before cooking to add richness and moisture. Lamb legs are sometimes studded with garlic cloves by piercing the meat with a paring knife and then pressing slivers of raw garlic into the holes.

A roast is sometimes cooked on a bed of mirepoix, or mirepoix is added to the roasting pan as the roast cooks. The mirepoix raises the roast off the bottom of the roasting pan, preventing the bottom from overcooking. This mirepoix, however, does not add any flavour to the roast. Rather, it combines with the drippings to add flavour to the jus, sauce or gravy that is made with them.

Cooking Temperatures

Small roasts such as a rack of lamb or a beef tenderloin should be seared first to caramelize the surface and then roasted at 135°C–165°C (275°F–325°F) to ensure a tender, juicy product with a higher yield.

Traditionally, large roasts were started at high temperatures to sear the meat and seal in the juices; they were then finished at lower temperatures. Studies have proven, however, that roasts cooked at constant, low temperatures provide a juicier product with better yield and less shrinkage. Temperatures between 120°C and 135°C (250°F and 275°F) are ideal for large roasts. These temperatures will result in an evenly cooked centre portion.

Determining Doneness

The doneness of small roasts such as a rack of lamb is determined in much the same way as with broiled or grilled meats. With experience, the cook develops a sense of timing as well as a feel for gauging the amount of resistance by touching the meat. These techniques, however, are not infallible, especially with large roasts.

Although timing is useful as a general guide for planning purposes, there are too many variables for it to be relied upon exclusively. As a guideline, roasts will require 30 to 50 minutes per kilogram (15–20 minutes per pound), depending on the desired doneness, type and size of roast and internal temperature of the cut.

MORE ABOUT ROASTING

Because roasting is a dry-heat cooking method, the best results come from using tender, well-marbled cuts from the rib, loin or leg. Larger or less tender cuts benefit from low-temperature roasting for longer times. This promotes moisture retention (better yield and flavour) and tenderness if the item is not cooked to medium-well or well done.

THE CHALLENGE

Selecting the best oven temperature for a roast requires considering several factors. The size of the roast, degree of marbling, shape, equipment and time available all play a role. Too high a heat will result in a drier, lower yield, less tender product. Too low a temperature may not allow for browning or melting of the marbled fat or hydrolyzing of the collagen. Generally, large cuts are cooked with low heat for longer times and smaller cuts on higher heat for shorter times.

FIGURE 12.7 *The Proper Placement of an Instant-Read Thermometer*

The best way to determine the doneness of a large roast is to use an instant-read thermometer as shown in Figure 12.7. The thermometer is inserted into the centre or thickest part of the roast and away from any bones. The proper finished temperatures for roasted meats are listed in Table 12.2.

Carryover Cooking and Resting

Cooking does not stop the moment a roast is removed from the oven. Through conduction, the heat applied to the outside of the roast continues to penetrate, cooking the centre for several more minutes. Indeed, the internal temperature of a small roast can rise by as much as 3°C–6°C (5°F–10°F) after being removed from the oven. With a larger roast, such as a 20-kg (50-lb.) beef hip, it can rise by as much as 11°C (20°F). Therefore, remove roasted meats before they reach the desired degree of doneness and allow carryover cooking to complete the cooking process. The temperatures listed in Table 12.2 are internal temperatures after allowing for carryover cooking.

As meat cooks, its juices flow towards the centre. If the roast is carved immediately after it is removed from the oven, its juices would run from the meat, causing it to lose its colour and become dry. Letting the meat rest before slicing allows the juices to redistribute themselves evenly throughout the roast, so the roast will retain more juices when carved. Small roasts, like a rack of lamb, need to rest only 5–10 minutes; larger roasts such as a hip of beef require as much as an hour.

Accompaniments to Roasted Meats

Roasts may be served with a sauce based on their natural juices (called *au jus*), as described in Recipe 12.2, Roast Prime Rib of Beef Au Jus, or with a pan gravy made with drippings from the roast. Additional sauce suggestions are found in Table 10.5.

TABLE 12.2

Degree of Doneness	Internal Temperature After Carryover
Very rare (Bleu)	52–54°C 125–130°F
Rare	55–60°C 130–140°F
Medium	60–65°C 140–150°F
Well done	65–75°C 150–165°F

Basic Procedure for Roasting Meats

1. Trim excess fat, tendons and silverskin from the meat. Leave only a thin fat covering, if possible, so the roast bastes itself as it cooks.
2. Season the roast as appropriate and place it in a roasting pan. The roast may be placed on a bed of mirepoix or on a rack.
3. Roast the meat, uncovered, at the desired temperature (the larger the roast, the lower the temperature), usually 120°C–165°C (250°F–325°F).
4. If a jus or pan gravy is desired and a mirepoix was not added at the start of cooking, it may be added 30–45 minutes before the roast is done, thus allowing it to caramelize while the roast finishes cooking.
5. Cook to the desired temperature.
6. Remove the roast from the oven, allowing carryover cooking to raise the internal temperature to the desired degree of doneness. Allow the roast to rest before slicing or carving it. As the roast rests, prepare the jus, sauce or pan gravy.

Applying the Basics

RECIPE 12.2

ROAST PRIME RIB OF BEEF AU JUS

Yield: 18 250-g (8-oz.) boneless servings

Beef rib, cover off, CMC#109D, approx. 7.5 kg (16 lb.)	1	1

RECIPE 12.2

Approximate values per serving:

Calories	551
Total fat	37 g
Saturated fat	16 g
Cholesterol	148 mg
Sodium	504 mg
Total carbohydrates	4.4 g
Protein	50 g

Salt and pepper	TT	TT
Garlic, chopped	TT	TT
Mirepoix	500 g	1 lb.
Brown stock	2 L	2 qt.

1. Season the roast with the salt, pepper and chopped garlic. Place the roast in an appropriate-sized roasting pan. Roast at 120°C–135°C (250°F–275°F).
2. Add the mirepoix to the pan approximately 1 hour before the roast is finished cooking. Continue cooking until the internal temperature reaches 52°C (125°F), approximately 4–4.5 hours. Carryover cooking will raise the internal temperature of the roast to approximately 60°C (140°F).
3. Remove the roast from the pan and allow it to rest in a warm place for 30 minutes.
4. Drain the excess fat from the roasting pan, reserving the mirepoix and any drippings in the roasting pan.
5. Caramelize the mirepoix on the stove top; allow the liquids to evaporate, leaving only brown drippings in the pan.
6. Deglaze the pan with brown stock. Stir to loosen all the drippings.
7. Simmer the jus, reducing it slightly and allowing the mirepoix to release its flavour; season with salt and pepper if necessary.
8. Strain the jus through a conical strainer lined with cheesecloth. Skim any remaining fat from the surface with a ladle.
9. Trim and slice the roast as described opposite and serve with approximately 30–60 mL (1–2 fl. oz.) jus per person.

1. Drain off the excess fat.

2. Caramelize the mirepoix.

3. Deglaze the pan with brown stock.

4. Simmer the jus, reducing it slightly and allowing the mirepoix to release its flavours.

5. Strain the jus through a conical strainer and cheesecloth.

Carving Roasts

All the efforts that went into selecting and cooking a perfect roast will be wasted if the roast is not carved properly. Roasts are always carved against the grain; carving with the grain produces long stringy, tough slices. Cutting across the muscle fibres produces a more attractive and tender portion. Portions may be cut in a single thick slice, as with Roast Prime Rib of Beef, or in many thin slices. The photographs following illustrate several different carving procedures.

Carving Prime Rib (Roast Ready, Cap On CMC#109)

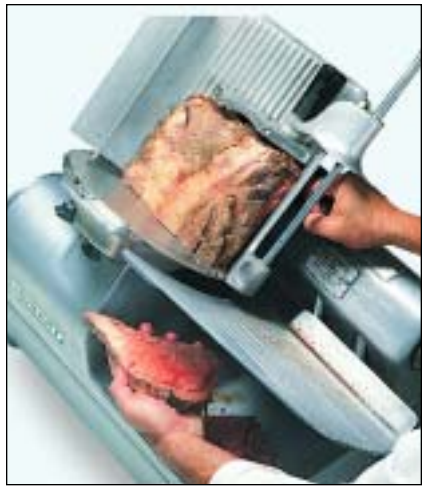
1. Remove the netting, cap fat and chine bones.

2. Trim the excess fat from the eye muscle.

3. Slice the rib in long, smooth strokes, the first cut (end cut) without a rib bone, the second cut with a rib bone, and so on.

Carving Prime Rib on the Slicer

1. When producing large quantities of prime rib, it is often more practical to slice it on a slicing machine. Following the steps illustrated above, remove the netting, cap fat and chine bone; trim excess fat from the eye muscle. Then use a long slicer, completely remove the rib eye from the rib bones, being careful to stay as close as possible to the bones to avoid wasting any meat.



2. After placing the rib on the slicing machine, set the machine to the desired thickness. The blade will have to be adjusted often because a roast's shape fluctuates.

Carving a Beef Hip

1. After setting the roast on the cutting board with the exposed femur bone (large end of the roast) down and the tibia (shank bone) or "handle" up, trim the excess exterior fat to expose the lean meat.

2. Begin slicing with a horizontal cut towards the shank bone, then make vertical cuts to release the slices of beef.

3. Keep the exposed surface as level as possible. Continue carving, turning the roast as necessary to access all sides.

Carving a Leg of Lamb

1. Hold the shank bone firmly, cut towards the bone.

2. Cut parallel to the shank bone to remove the slices.

3. Rotate the leg as needed to access the meat on all sides.

Sautéing

Sautéing is a dry-heat cooking method using high heat and selected for smaller cuts in which heat is conducted by a small amount of fat. Sautéed meats should be tender (a reflection of the quality of the raw product), of good colour (determined by proper cooking temperatures) and have a good overall flavour. Any accompanying sauce should be well seasoned and complement the meat without overpowering it.

Selecting Meats to Sauté

As with broiling, grilling and roasting, you should use tender meats of the highest quality in order to produce good results when sautéing. The cuts should be uniform in size and shape to promote even cooking.

Seasoning Meats to Be Sautéed

The meat can be marinated or simply seasoned with salt and pepper. If marinated, the meat must be patted dry before cooking to ensure proper browning. Some meats are dusted with flour before cooking to help dry the

surface and promote even browning. It may provide some thickening of the sauce. The sauces that almost always accompany sautéed meats provide much of the flavour.

Determining Doneness

As with broiled and grilled meats, the doneness of sautéed meats is determined by touch and timing. Red meats should be well browned; veal and pork should be somewhat lighter.

Accompaniments to Sautéed Meats

Sauces served with sautéed meats are usually made directly in the sauté pan, utilizing the **fond**. They often incorporate a previously thickened sauce. Additional sauce suggestions for sautéed meats are found in Table 10.5.

Basic Procedure for Sautéing Meats

1. Heat a sauté pan and add enough oil or clarified butter just to cover the bottom. The pan should be large enough to hold the meat in a single layer. A pan that is too large may cause the fat or meat to burn.
2. Cut the meat into **cutlets**, **escallopes**, **émincés**, **medallions**, **mignonnettes**, **noisettes**, **chops** or small even-sized pieces. Season the meat and dredge in flour if desired.
3. Add the meat to the sauté pan in a single layer. Do not crowd the pan.
4. Adjust the temperature so that the meat's exterior browns properly without burning and the interior cooks. The heat should be high enough to complete the cooking process before the meat begins to stew in its own juices.
5. Small items may be tossed using the sauté pan's sloped sides to flip them back on top of themselves. Do not toss the meat more than necessary, however. The pan should remain in contact with the heat source as much as possible to maintain proper temperatures. Larger items should be turned using tongs or a kitchen fork. Avoid splashing hot fat.
6. Transfer the meat to another pan and proceed with preparing the sauce and/or garnish; combine the meat with the sauce and finish cooking.

Basic Procedure for Making a Sauce in the Sauté Pan

1. If a sauce is to be made in the sauté pan, hold the meat in a warm spot while preparing the sauce. When the meat is removed from the pan, leave a small amount of fat as well as the fond. If there is excessive fat, degrease the pan, leaving just enough to cover its bottom. Add ingredients such as garlic, shallots and mushrooms that will be used as garnishes and sauce flavourings; sauté them.
2. Deglaze the pan with wine or stock. Scrape the pan, loosening the fond and allowing it to dissolve in the liquid. Reduce the deglazing liquid by approximately three-quarters.
3. Add fond lié (or demi-glace) or stock to the pan. Cook and reduce the sauce to the desired consistency. Other sauces may be used.
4. Add any ingredients that do not require cooking such as herbs and spices. Adjust the seasonings with salt and pepper.
5. For service, the meat may be returned to the pan for a moment to reheat it and coat it with the finished sauce. The meat should remain in the sauce just long enough to reheat. Do not attempt to cook the meat in the sauce.

Applying the Basics

RECIPE 12.3

Sautéed Veal Scallopini with White Wine Lemon Sauce

Yield: 6 180-g (6-oz.) Servings

Veal scallopini, 90 g (3 oz.) each	12	12
Clarified butter	60 g	2 fl. oz.
Flour	120 g	4 oz.
Salt and pepper	TT	TT
Shallots, chopped	20 g	2 Tbsp.
White wine	175 mL	6 fl. oz.
Lemon juice	50 mL	2 fl. oz.
Brown veal stock	125 mL	4 fl. oz.
Unsalted butter*	50 g	2 oz.
Lemon wedges	12	12

1. Pound the scallopini to a uniform thickness, as described in Chapter 14, Veal.
2. Heat a sauté pan and add the clarified butter.
3. Dredge the scallopini in seasoned flour and add to the pan in a single layer. Sauté on each side for 1–2 minutes. As the first scallopini are done, remove them to a warm platter and sauté the remaining scallopini.
4. Add the chopped shallots to the pan and sauté.
5. Deglaze the pan with the white wine and lemon juice.
6. Add the brown veal stock and reduce by half.
7. Swirl in the unsalted butter (monter au beurre).
8. Adjust the seasonings with salt and pepper.
9. Serve 2 scallopini per person with approximately 30 mL (1 fl. oz.) of sauce. Garnish with lemon wedges.

*The sauce may be modified to reduce the amount of butter. In Step 7, thicken the sauce with arrowroot or cornstarch and finish with 10 g (2 tsp.) butter.

Scallopini Sauce

The sauce for the scallopini can be easily adapted to produce a wide variety of dishes. Omit the wine and lemon and try tomato sauce, zingara, marsala or mushroom sauce. Add a vegetable or fruit garnish or fresh herbs or a bit of cream.

RECIPE 12.3

Approximate values per serving:

Calories	665
Total fat	49 g
Saturated fat	19 g
Cholesterol	165 mg
Sodium	1180 mg
Total carbohydrates	20 g
Protein	36 g

Pan-Frying

Pan-frying is generally selected for larger cuts and uses more fat and lower heat than sautéing to conduct heat. Pan-fried meats should be tender (a reflection of the quality of the raw product), of good colour (determined by proper cooking temperatures) and with a good overall flavour. Meats to be pan-fried are

1. Add the veal cutlets to the pan. Note the relationship of scallopini to pan size.

2. Add the chopped shallots to the pan and sauté them.

3. Deglaze the pan with white wine and lemon juice.

4. Add the brown veal stock and reduce by half.

5. Swirl in the butter and adjust the seasonings.

usually breaded. In addition to providing flavour, breading seals the meat. The breading should be free from breaks, thus preventing the fat from coming into direct contact with the meat or collecting in a pocket formed between the meat and the breading. Pan-fried items should be golden in colour and the breading should not be soggy.

Selecting Meats to Pan-Fry

As with other dry-heat cooking methods, tender meats of high quality should be used because the meat will not be tenderized by the cooking process. Meats that are pan-fried are often cut into cutlets or escallops and may be delicated, pounded or jacquarded to tenderize.

Seasoning Meats to Be Pan-Fried

Pan-fried meats are usually seasoned lightly with salt and pepper either by applying them directly to the meat or adding them to the flour used in the breading procedure.

Determining Doneness

The most accurate way to determine the doneness of a pan-fried item is by timing. The touch method is difficult to use because of the large amounts of hot fat. It also may not be as accurate as with broiled or grilled meats because pan-fried meats are often quite thin.

Accompaniments to Pan-Fried Meats

Any sauce served with pan-fried meats is usually made separately because there is often no fond (drippings) created during the pan-frying process. Sauce suggestions are listed in Table 10.5.

Basic Procedure for Pan-Frying Meats

1. Slice the meat into cutlets and pound, if required, as described in Chapter 14, Veal.
2. Bread the meat using the standard breading procedure detailed in Chapter 21, Deep-Fat Frying.
3. Heat a moderate amount of fat or oil in a heavy pan. The temperature should be slightly lower than that used to sauté so that the breading will be nicely browned when the item is fully cooked.
4. Place the meat in the pan, being careful not to splash the hot oil. The meat should be immersed one-third. Fry until golden brown. Turn and brown the other side. Ideally, pan-fried meats should be fully cooked when they are well browned on both sides.
5. Remove the meat from the pan; drain it on absorbent paper before serving.

Applying the Basics

RECIPE 12.4

Breaded Pork Cutlets

Yield: 10 125-g (4-oz.) Servings

Pork cutlet, 125 g (4 oz.) each	10	10
Salt and pepper	TT	TT
Standard breading:	as needed	as needed
Flour		
Eggs		
Milk		
Bread crumbs		
Vegetable oil	as needed	as needed
Butter (optional)	175 g	6 oz.
Lemon wedges	20	20

1. Using a mallet, pound the cutlets to an even thickness, approximately 0.5 cm (1/4 inch). Season the cutlets with salt and pepper.
2. Bread the cutlets using the standard breading procedure described in Chapter 21, Deep-Fat Frying.
3. Heat a heavy pan to moderate heat; add approximately 0.25 cm (1/8 inch) of oil.
4. Add the cutlets in a single layer. Do not crowd the pan. Brown on one side, then the other. Total cooking time should be approximately 4 minutes.
5. Remove the cutlets and drain on absorbent paper.
6. Melt the butter in a small pan until it foams.
7. Place one cutlet on each plate and pour approximately 15 mL (1/2 fl. oz.) butter over each portion. Garnish with lemon wedges.

Note: Chops, plain or stuffed, use this method, as does Cordon Bleu.

RECIPE 12.4

Approximate values per serving:

Calories	444
Total fat	24 g
Saturated fat	6.8 g
Cholesterol	155 mg
Sodium	590 mg
Total carbohydrates	19 g
Protein	38 g

Moist-Heat Cooking Methods

Moist-heat cooking methods subject food to heat and moisture. Moist heat is often, but not always, used to tenderize tougher cuts of meat through long, slow cooking. Simmering is the only moist-heat cooking method discussed here as it is the one most frequently used with meat. Poaching is covered in fish, poultry and egg cooking.

1. Add the breaded cutlets to the hot pan. Note the amount of oil in the pan.

2. Turn the cutlets to brown on the second side.

3. Melt the butter in a separate pan until it foams.

4. Pour the butter over the cutlet.

TO BOIL OR NOT TO BOIL

Temperature is the essential difference between poaching, simmering, boiling and steaming. Select the temperature based on the nature of the item being cooked—is it large or small, tender or tough, firm or delicate?

The term "boiled" is often used in recipe names; however, we know that boiling usually results in a dry, stringy product. Simmering is really the method used. Boiling is essential to the success of some dishes such as bouillabaise, where the olive oil must be emulsified into the cooking liquid by the action of the boiling.

Simmering

Simmering is usually associated with specific tougher cuts of meat that need to be tenderized through long, slow, moist cooking. Quality simmered meats are moist and have good flavour and texture. The flavour is determined by the cooking liquid; the texture and moistness are a result of proper cooking temperatures and time.

Selecting Meats to Simmer

Meats such as fresh or corned beef brisket, fresh or cured hams and tongue are often simmered. Beef briskets and tongues, pork butts and hams are often simmered whole. The recipe name usually says "boiled."

Seasoning Meats to Be Simmered

If the meat to be simmered was cured and/or smoked (as with cured hams, ham hocks, smoked pork butt, corned beef or pickled tongue), the cooking liquid will not be used to make a sauce but should be seasoned with herbs and spices. Indeed, simmering cured meats helps leach out some of the excess salt, making the finished dish more palatable.

Cooking Temperatures

Moist-heat cooking methods generally use lower temperatures than dry-heat cooking methods. Meats are normally simmered at temperatures between 82°C and 93°C (180°F and 200°F). In larger food service operations, meats such as hams and corned beef are cooked at temperatures as low as 65°C (150°F) for up to 12 hours. Although lower cooking temperatures result in less shrinkage and a more moist and tender finished product, long cooking times may not always be practical, cost efficient or healthy.

Determining Doneness

Tougher cuts are almost always cooked well done, which is determined by tenderness. The size and quality of the raw product determines the cooking time. Undercooked meats will be tough and chewy. Overcooked meats will be stringy and may even fall apart.

To test large cuts of meat for doneness, a kitchen fork should be inserted into the meat and the meat should slide easily off the fork. Smaller pieces of meat should be tender to the bite or easily cut with a table fork.

Accompaniments to Simmered Meats

Simmered meats are often served with boiled or steamed vegetables, for example, corned beef and cabbage. Pickled meats are often served with mustard or horseradish sauce on the side or perhaps a cider raisin sauce.

Basic Procedure for Simmering Meats

1. Cut, trim or tie the meat according to the recipe.
2. Bring an adequate amount of liquid to a boil. There should be enough liquid to cover the meat completely. Too much liquid will leach off much of the meat's flavour; too little will leave a portion of the meat exposed, preventing it from cooking. Because the dish's final flavour is determined by the flavour of the liquid, use plenty of mirepoix, flavourings and seasonings.
3. When simmering smoked or cured items, start them in cold water. This helps draw off some of the strong pickled or smoked flavours.
4. Add the meat to the liquid.

5. Reduce the heat to the desired temperature and cook until the meat is tender. Do not allow the cooking liquid to boil. Boiling results in a tough or overcooked and stringy product. If the simmered meat is to be served cold, a moister and juicier product can be achieved by removing the pot from the stove before the meat is fully cooked. The meat and the liquid can be cooled in a water bath like that for a stock, as described in Chapter 10, Stocks and Sauces. This allows the residual heat in the cooking liquid to finish cooking the meat.

Applying the Basics

RECIPE 12.5

New England Boiled Dinner

Yield: 12 180-g (6-oz.) Servings

Corned beef brisket, 3.6 kg (8 lb.)	1	1
White stock	as needed	as needed
Sachet:		
Bay leaves	2	2
Dried thyme	0.25 g	1/2 tsp.
Peppercorns, cracked	0.5 g	1/2 tsp.
Parsley stems	10	10
Mustard seeds	10 g	1 Tbsp.
Cinnamon sticks	10 g	2
Allspice berries (whole)	4	4
Baby red beets	24	24
Baby turnips	24	24
Baby carrots	24	24
Brussels sprouts	24	24
Pearl onions	24	24
Potatoes, Red Bliss	24	24
Salt and pepper	TT	TT

1. Place the beef in a pot and add enough stock to cover it. Add the sachet, bring to a boil and reduce to a simmer.
2. Simmer until the beef is tender, approximately 3 hours. Remove the beef and hold in a hotel pan in a small amount of the cooking liquid.
3. Peel or prepare the vegetables and potatoes as needed and cook separately in a portion of the cooking liquid.
4. Carve the beef and serve with 2 of each of the vegetables and horseradish sauce (see page 209).

RECIPE 12.5

Approximate values per serving:

Calories	673
Total fat	45 g
Saturated fat	14 g
Cholesterol	162 mg
Sodium	426 mg
Total carbohydrates	20 g
Protein	47 g

1. Place the corned beef and sachet in an appropriate pot and cover with stock.

2. Carve the beef and present it with the vegetable garnish.

Combination Cooking Methods

Braising and stewing are referred to as combination cooking methods because both dry heat and moist heat are used to achieve the desired results.

Braising

Braised meats are first browned and then cooked in a liquid that serves as a sauce for the meat. A well-prepared braised dish has the rich flavour of the meat in the sauce and the moisture and flavour of the sauce in the meat. It should be fork tender but not falling apart. The meat should have an attractive colour from the initial browning and final glazing.

Selecting Meats to Braise

Braising can be used for tender cuts (such as those from the loin or rib) or tougher cuts (such as those from the chuck or shank). Any meat to be braised should be well marbled with ample fat content to produce a moist finished product.

If tender cuts such as veal chops or pork chops are braised, the finished dish has a uniquely different flavour and texture than if they were cooked by a dry-heat method. Tender cuts require shorter cooking times than tougher cuts because lengthy cooking is not needed to break down connective tissue.

More often, braising is used with tougher cuts that are tenderized by the long, moist cooking process. Cuts from the chuck, outside round and shank are popular choices, as they are very flavourful and contain relatively large amounts of collagen, which adds richness to the finished product.

Large pieces of meat can be braised, then carved like a roast (pot roast). Portion control cuts and diced meats can also be braised.

Seasoning Meats to Be Braised

The overall flavour of a braised dish is largely the result of using quality cooking liquids and the mirepoix, herbs, spices and other ingredients that flavour the meat as it cooks. Braised meats can be marinated before they are cooked to help tenderize them and add flavour. The marinade may be incorporated into the braising liquid. Salt and pepper may be added to the flour if the meat is dredged before it is browned, or the meat may be seasoned directly (although the salt may draw out moisture and inhibit browning).

As a general rule, flavouring and seasoning ingredients, including tomato products, are added at the start of simmering to ensure even flavour penetration during cooking. Care must be taken not to overseason too early, as the sauce will reduce during cooking.

Cooking Temperatures

Braised meats are usually browned before simmering. As a general rule, smaller cuts are floured before browning; larger cuts are not. Flouring dries the surface of the meat, promotes even browning and provides some thickening to the sauce that accompanies the meat. Whether floured or not, the meat is browned in fat. After browning, white meats should be golden to amber in colour; red meats should be dark brown. Do not brown the meat too quickly at too high a temperature, as it is important to develop a well-caramelized surface. The caramelized surface adds colour and flavour to the final product.

The meat and the braising liquid are brought to a simmer over direct heat and the pot is covered. Cooking can be finished in the oven or on the stove top. The oven provides gentle, even heat without the risk of scorching. If the braise is finished on the stove top, proper temperatures must be maintained carefully throughout the cooking process and great care must be taken to prevent scorching or burning. Lower temperatures and longer cooking times result in more even cooking and thorough penetration of the cooking liquid, providing a more flavourful final product.

Finishing Braised Meats

Near the end of the cooking process, the lid may be removed from oven-braised meats. Finishing braised meats without a cover serves two purposes. First, the meat can be glazed by basting it often. (As the basting liquid evaporates, the meat is browned and a strongly flavoured glaze is formed.) Second, removing the lid allows the cooking liquid to reduce, thickening it and concentrating its flavours for use as a sauce.

Determining Doneness

Braised meats are done when they are tender. A fork inserted into the meat should meet little resistance. Properly braised meats should remain intact and not fall apart when handled gently.

Braised meats that fall apart or are stringy are overcooked. If the finished product is tough, it was probably undercooked or cooked at too high a temperature. If the entire dish lacks flavour, the meat may not have been properly browned or the cooking liquid may have been poorly seasoned.

Accompaniments to Braised Meats

Large braised items are often served like roasts. They are carved across the grain in thin slices and served with their sauce. Vegetables can be cooked with the braised meat, cooked separately and added when the main item has finished cooking or added at service. If the vegetables are cooked with the main item, they should be added at intervals based on their individual cooking times to prevent overcooking.

Basic Procedure for Braising Meats

The liquid used for braising is usually thickened in one of three ways:

1. With a roux added at the start of the cooking process; the roux thickens the sauce as the meat cooks.
2. Prethickened before the meat is added.
3. Thickened after the meat is cooked either by puréeing the mirepoix or by using roux, arrowroot or cornstarch.

The procedure for braising meats includes variations for whichever thickening method is selected.

1. Heat a small amount of oil in a heavy pan.
2. Dredge the meat to be braised in seasoned flour, if desired, and add it to the oil.
3. Brown the meat well on all sides and remove from the pan.
4. Add a mirepoix to the pan and caramelize it well. If using roux, it should be added at this time.
5. Add the appropriate stock or sauce so that when the meat is returned to the pan it will be immersed approximately one-third.
6. Add aromatics and seasonings.
7. Return the meat to the sauce. Tightly cover the pot and bring it to a simmer. Cook slowly either on the stove top or by placing the covered pot directly in an oven at 120°C–150°C (250°F–300°F).
8. Cook the item, basting or turning it often so that all sides of the meat benefit from the moisture and flavour of the sauce.
9. When the meat is done, remove it from the pan and hold it in a warm place while the sauce is finished.
10. The sauce may be reduced on the stove top to intensify its flavours. If the meat was braised in a stock, the stock may be thickened using a roux, arrowroot or cornstarch. Strain the sauce or, if desired, purée the mirepoix and other ingredients and return them to the sauce. Adjust the sauce's consistency as desired.

Paradox

Cooking any meat to achieve optimum palatability is a challenge. The product's characteristics and the customer's desires must be brought together. Longer cooking times, often associated with less tender cuts, usually means the product will be well done. Well-done meat becomes dry and stringy. The hydrolyzed collagen (gelatin) ends up in the sauce as does any fat. The cook must find a balance in controlling the cooking process to achieve the best results despite the chemistry. Careful thought must go into planning the menu, purchasing the appropriate product and applying the best cooking method to ensure customer satisfaction. Always analyze a recipe thoroughly and, if necessary, adapt the ingredients or method to have the chemistry working for you. Even very tender, well-marbled cuts can be ruined by applying inappropriate methodologies. Tenderloin can be tough!

David MacGillivray
From the time he was 15 years old, working in a restaurant in Picton, Ontario, David knew he wanted to be a chef. He quickly became renowned in Canada, particularly for his work in the Edith Cavell Dining Room at Jasper Park Lodge. He is now the Director of Food and Beverage at the luxurious Château Lake Louise.

Applying the Basics

RECIPE 12.6

Alberta Beef Cheeks with Root Vegetables, Baby Onions and Wild Mushrooms, Braised in a Stone Church Baco Noir Sauce

FAIRMONT CHÂTEAU LAKE LOUISE, Lake Louise, AB
Director, Food and Beverage, David MacGillivray

Note: *You can use beef stewing meat as a substitute for the cheeks if they are unavailable or not to your liking.*

Yield: 6 Servings

Canola oil	50 mL	2 fl. oz.
Beef cheeks (trimmed of excess fat)	2 kg	4.5 lb.
Salt and pepper	TT	TT
Onion, peeled and chopped	300 g	1
Carrot, peeled and chopped	75 g	1
Celery stalk, chopped	75 g	1
Garlic cloves, minced	25 g	6
Stone Church Baco Noir	500 mL	18 fl. oz.
Bay leaves	2	2
Brown stock	3 L	100 fl. oz.
Canola oil	50 mL	2 fl. oz.
Carrots, medium, peeled and large dice	150 g	2
Purple-top turnip, peeled, large dice	150 g	1
Parsnip, medium, peeled, large dice	150 g	2
Fresh baby onions, large, cippoline if available	350 g	8–10
Chanterelles	50 g	2 oz.
Lobster mushrooms	50 g	2 oz.
Portobello mushrooms	75 g	2-1/2 oz.
Stone Church Baco Noir	250 mL	9 fl. oz.
Roasted garlic	50 g	2 oz.
Salt and coarsely ground black pepper	TT	TT
Butter	100 g	3-1/2 oz.

1. In a heavy-bottomed pot, heat canola oil, season the cheeks with salt and pepper and brown evenly and thoroughly.
2. Remove the cheeks from the pot and add the vegetables and garlic and sauté until tender.
3. Add red wine and bay leaves and deglaze the pan. Return the cheeks to the pan and add the stock.
4. Cover with a lid and place in an oven at 180°C (275°F). Cook the cheeks for 4–5 hours, checking occasionally.
5. Remove the pan from the oven. Take the cheeks out of the broth and set aside. Strain the broth through a fine etâmine and set aside for finishing.
6. To finish the dish, in a heavy-bottomed saucepan, heat 50 mL (2 fl. oz.) canola oil and sauté the root vegetables, onions and mushrooms, approximately 5 minutes.

7. Add the remaining 250 mL (9 fl. oz.) wine from the bottle, and the poaching stock.
8. Cook the vegetables, mushrooms and the stock over medium heat for approximately 30 minutes, or until tender.
9. Add the beef cheeks to the broth to bring them back to temperature.
10. Remove the cheeks and slice them; place them on a serving platter.
11. Remove the vegetables and surround the cheeks with them. Cover and keep warm in a low oven.
12. Bring the stock to a boil and add the roasted garlic. Reduce heat to medium and cook for 15 minutes. Remove from the heat and adjust the seasoning with salt and pepper. Whisk in the butter at the last minute and ladle over the beef cheeks and vegetables.
13. Serve the cheeks on a large earthenware platter with a big bowl of creamy mashed potatoes and warm bread for sopping up the sauce.

RECIPE 12.6

Approximate values per serving:

Calories	943
Total fat	59 g
Saturated fat	20 g
Cholesterol	241 mg
Sodium	1167 mg
Total carbohydrates	35 g
Protein	68 g

Stewing

Stewing is a combination cooking method. In many ways, the procedures for stewing and braising are identical, although stewing is usually associated with smaller or bite-sized pieces of meat.

There are two main types of stews: brown stews and white stews.

When making **brown stews**, the meat is first browned in fat; then a cooking liquid is added. The initial browning adds flavour and colour to the finished product. The same characteristics apply to a good brown stew that apply to a good braised dish: It should be fork tender and have an attractive colour and rich flavour.

There are two types of **white stews**: **fricassees**, in which the meat is first cooked in a small amount of fat without colouring, then combined with a cooking liquid; and **blanquettes**, in which the meat is first blanched, then rinsed and added to a cooking liquid. White stew should have the same flavour and texture characteristics as a brown stew, but should be white or ivory in colour.

Vegetables to garnish stews are cut uniformly and attractively, as they are left in the dish for service. Flavourings such as a bouquet garni or sachet can easily be removed.

Selecting Meats to Stew

Stewing uses moist heat to tenderize meat just as braising does, therefore many of the same cuts can be used. Meats that are to be stewed should be trimmed of excess fat and connective tissue and cut uniformly into 2.5- to 5-cm (1- to 2-inch) cubes.

Seasoning Meats to Be Stewed

Stews, like braised meats, get much of their flavour from their cooking liquid. A stew's seasoning and overall flavour are a direct result of the quality of the cooking liquid and the vegetables, herbs, spices and other ingredients added during cooking.

Cooking Temperatures

Meats for brown stews are first cooked at high temperatures over direct heat until well browned. Meats for fricassees are first sautéed at low temperatures so they do not develop colour.

STEW TERMINOLOGY

Ragout—A general term that refers to white or brown stews in which the meat is cooked by dry heat before liquid is added. In French, ragoût means "to bring back the taste."

Fricassee—A white ragout usually made from white meat or small game, seared without browning and garnished with small onions and mushrooms.

Navarin—A brown ragout generally made with lamb, root vegetables, onions and peas.

Blanquette—A white stew in which the meat is first blanched, then added to a stock or sauce to complete the cooking and tenderizing process. Blanquettes are finished with a liaison of egg yolks and heavy cream.

Chili con carne—A ragout of ground or diced meat cooked with onions, chile peppers, cumin and other spices. Despite the objections of purists, chili sometimes contains beans.

Paprikash—A Hungarian stew thickened with onions, flavoured with paprika and garnished with potatoes. Pörkölt is braised and has more paprika and less liquid. Gulyás (goulash) is more like a soup.

Once the cooking liquid has been added and the moist-heat cooking process has begun, do not allow the stew to boil. Stews benefit from low-temperature cooking. If practical, stews can be covered and finished in the oven.

Determining Doneness

Stewed meats are done when they are fork tender. Test them by removing a piece of meat to a plate and cutting it with a fork. Any vegetables that are cooked with the meat should be added at the proper times so that they and the meat are completely cooked at the same time.

Accompaniments to Stewed Meats

Stews are often complete meals in themselves, containing meat, vegetables and starches in one dish. Stews that do not contain a starch are often served with pasta, rice, boiled potatoes or dumplings.

Basic Procedure for Stewing Meats—Brown Stews

Red meats, lamb or game are used in brown stews. The procedure for making a brown stew is very similar to braising.

1. Trim the meat of excess fat and silverskin and cut into 2.5- to 5-cm (1- to 2-inch) pieces.
2. Dredge the meat in flour if desired. Heat an appropriate-sized pan and add enough oil to cover the bottom. Cook the meat in the oil, browning it well on all sides. Onions and garlic can be added at this time and browned.
3. Add flour to the meat and fat and cook to make a brown roux.
4. Gradually add the liquid to the roux, stirring to prevent lumps. Bring the stew to a boil and reduce to a simmer.
5. Add a tomato product and a sachet or a bouquet garni. Cover and place in the oven or continue to simmer on the stove top until the meat is tender. Add other ingredients such as vegetables or potatoes at the proper time so that they will be done when the meat is tender.
6. When the meat is tender, remove the sachet or bouquet garni. The meat may be strained out and the sauce thickened with roux, cornstarch or arrowroot or reduced to concentrate its flavours.
7. If not added during the cooking process, vegetables and other garnishes may be cooked separately and added to the finished stew.

1. Brown the beef.

2. Sauté the garlic and onions until slightly browned.

Applying the Basics

RECIPE 12.7

Brown Beef Stew

Yield: 8 250-mL (8-fl. oz.) Servings

Oil	60 mL	2 fl. oz.
Beef chuck or shank, trimmed and cut into 3.5-cm (1-1/2-in.) cubes	2 kg	4 lb. 8 oz.
Salt	10 g	2 tsp.
Pepper	0.5 g	1/2 tsp.
Onion, small dice	300 g	10 oz.
Garlic clove, chopped	5 g	1
Red wine	250 mL	8 fl. oz.
Brown stock	1 L	1 qt.
Tomato purée	125 mL	4 fl. oz.

Sachet:		
Bay leaves	2	2
Dried thyme	0.25 g	1/2 tsp.
Peppercorns, crushed	0.5 g	1/2 tsp.
Parsley stems	10	10

1. Heat a heavy pot until very hot and add the oil.
2. Season the beef and add it to the pot, browning it well on all sides. Do not overcrowd the pot. If necessary, cook the beef in several batches.
3. Add the onion and garlic and sauté until the onion is slightly browned.
4. Add the red wine and brown stock.
5. Add the tomato purée and the sachet.
6. Bring to a simmer and cook until the beef is tender, approximately 1.5–2 hours.
7. Degrease the stew by skimming off the fat.
8. Optional: Remove the cooked beef from the sauce, strain the sauce and thicken slightly with a starch product. Return the beef to the sauce.

VARIATION: Vegetables such as mushrooms, turnips, carrots, celery and pearl onions can be cooked separately and added to the stew as garnish.

RECIPE 12.7

Approximate values per serving:

Calories	682
Total fat	50 g
Saturated fat	17 g
Cholesterol	172 mg
Sodium	710 mg
Total carbohydrates	10 g
Protein	48 g

Basic Procedure for Stewing Meats—Braised White Stews (Fricassees)

The procedure for making fricassees is similar to the procedure for brown stews. The primary difference is that the meat is sautéed but not allowed to brown. The braised white stew (fricassee) procedure outlined below is the basis for Recipe 14.12, Veal Fricassee.

1. Trim meat of excess fat and silverskin and cut into 2.5- to 5-cm (1- to 2-inch) pieces.
2. Heat an appropriate-sized pan and add enough oil to cover the bottom. Add the meat (and often an onion) to the pan and cook without browning.
3. Sprinkle the meat (and onion) with flour and cook to make a blond roux.
4. Gradually add the liquid, stirring to prevent lumps. Bring the stew to a boil and reduce to a simmer.
5. Add a bouquet garni and seasonings. Cover the stew and place in the oven or continue to simmer on the stove top, being careful not to burn or scorch the stew.
6. Continue to cook until the meat is tender. If the sauce is too thin, remove the meat from the sauce and hold the meat in a warm place. Reduce the sauce to the proper consistency on the stove top or thicken it by adding a small amount of blond roux, cornstarch or arrowroot.

Basic Procedure for Stewing Meats—Simmered White Stews (Blanquettes)

Unlike fricassees, blanquettes contain meat that is blanched, not sautéed. (Because the meat is cooked only by moist heat and never by dry heat, the blanquette cooking process is not a true combination cooking method; nevertheless, because of its striking similarities to stewing, it is included here.) The most common blanquette is made with veal and is known as blanquette de veau, but any white meat or lamb can be prepared in this manner using a variety of garnishes.

3. Add the red wine and beef stock.

4. Add the tomato purée and sachet.

5. Degrease the stew.

1. Trim meat of excess fat and silverskin and cut into 2.5- to 5-cm (1- to 2-inch) pieces.
2. Blanch the cubed meat by placing the meat in an appropriate pot, covering with cool water, adding salt and bringing it rapidly to a boil. Drain the water. Rinse the meat to remove any impurities.
3. Return the meat to the pot and add enough stock to cover. Add a bouquet garni, salt and pepper. Simmer until the meat is tender, approximately 1 to 1.5 hours.
4. Strain the meat from the stock. Discard the bouquet garni. Bring the stock to a boil, thicken it with a blond roux and simmer for 15 minutes.
5. Return the meat to the thickened stock and heat to just under 85°C (185°F). Remove from the heat and add the egg yolk and cream liaison just before service. Do not boil or the egg yolks will curdle.
6. If any vegetables are to be added they should be cooked separately and added to the thickened stock with the meat.
7. Adjust the seasoning with a few drops of lemon juice, nutmeg or salt and pepper as needed.

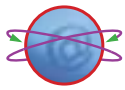
CONCLUSION

Because meat may account for the largest portion of your food-cost dollar, it should be purchased carefully, stored properly and fabricated appropriately. The various cuts and flavours of meat (beef, veal, lamb and pork) can be successfully broiled, grilled, roasted, sautéed, pan-fried, simmered, braised or stewed, provided you follow a few simple procedures and learn which cuts respond best to the various cooking methods.

QUESTIONS FOR DISCUSSION

1. Explain the difference between primals, subprimals and fabricated cuts of meat. Why is it important to be skilled in meat fabrication?
2. What is connective tissue composed of and where is it found? What happens to connective tissues at normal cooking temperatures?
3. Discuss the government's role in regulating the marketing and sale of meat.
4. Explain why meats are subject to a health inspection. What is the purpose of grading carcass meat?
5. At what temperature should fresh meat be stored? At what temperature should frozen meat be stored?
6. Would it be better to grill or braise a piece of meat that contains a great deal of connective tissue? Explain your answer.
7. List three ways to improve the cooking qualities of lean meats. What techniques can be used to compensate for the lack of fat?
8. Describe the similarities between sautéing meats and pan-frying them. Describe the differences.
9. Describe the similarities between braising meats and stewing them. Describe the differences.

WEBLINKS



Meat Cuts and Grading
www.aps.uoguelph.ca/~swatland/ch3_0.htm

Beef Information Centre
www.cattlemen.bc.ca/bic.htm

Alberta Pork Producers
www.albertapork.com

Ontario Veal Association
www.ontarioveal.on.ca

ABC's of Meat Cooking
www.tasteofamerica.com/abc/abc_meat.html