

Meat Cookery

SECTIONS

23.1 Meat Basics

23.2 Meat Cuts

23.3 Principles of Cooking Meat

WRITING ACTIVITY

Letter to the Editor

Write a letter to the editor about your views on eating meat. Explain your choice. If you support eating meat, give tips for healthful meat eating. If you do not, give suggestions for a healthful diet without meat.

Writing Tips

- 1 Write concise sentences that clearly state your thoughts.
- 2 Link the sentences together clearly and logically.
- 3 Support your position with facts, statistics, and citations.

EXPLORE THE PHOTO

Meat is the main component of many delicious entrees. *What are some commonly eaten types of meat?*



Meat Basics

Reading Guide

Before You Read

How Can You Improve? Before starting this section, think about the last exam you took on material you had to read. What reading strategies helped you on the test? Make a list of ways to improve your strategies to succeed on your next exam.

Read to Learn

Key Concepts

- **Identify** the structure and cuts of meat.
- **Summarize** the details of meat inspection, grading, handling, and storage.


Main Idea

Meat is an essential part of most foodservice operations' menus. It is important to know how to purchase and safely store meat.

Graphic Organizer

Use a chart like the one below to list and describe the three components of meat found in this section.

Meat Component	Description

 **Graphic Organizer** Go to this book's Online Learning Center at glencoe.com for a printable graphic organizer.

Content Vocabulary

- meat
- marbling
- fat cap
- barding
- larding
- muscle fibers
- collagen
- elastin
- primal cut
- fabricated cut
- carcass
- yield grade

Academic Vocabulary

- composed
- reveal

You must know how to choose the right types of meat for a menu.

ACADEMIC STANDARDS

English Language Arts

NCTE 12 Use language to accomplish individual purposes.

Mathematics

NCTM Number and Operations Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

Social Studies

NCSS I B Culture Predict how experiences may be interpreted by people from diverse cultural perspectives and frames of reference.

NCSS V B Individuals, Groups, and Institutions Analyze group and institutional influences on people, events, and elements of culture in both historical and contemporary settings.

NCTE National Council of Teachers of English

NCTM National Council of Teachers of Mathematics

NSES National Science Education Standards

NCSS National Council for the Social Studies

Structure of Meat

Meat is an important part of many people's diets. It is also an essential part of most food-service establishment menu offerings. It is very important to learn about the different types of meats available. You will need to know how to purchase the best cuts of meat and how to safely store them.

Meat is the muscle of animals, such as found in cattle and hogs. In general, all meats contain the same three basic nutrients: water, protein, and fat.

Meat has the following amount of nutrients:

- About 75% of muscle is water
- About 20% of muscle is protein
- About 5% of muscle is fat

Water is a very important nutrient to keep in mind when preparing meat. Too much cooking will make meat dry. As meat cooks, it gets smaller due to shrinkage. Shrinkage happens when the meat loses water as it cooks. The longer you cook meat, the less it will weigh. Meats cooked at low temperatures do not lose as much water as meats cooked at high temperatures.

There are two types of fat in meat: marbling and fat cap. **Marbling** is fat within the muscle tissue. The amount of marbling affects the meat's tenderness, taste, and quality. In general, the more marbling there is in a piece of meat, the more tender and flavorful the meat will be.

The **fat cap** is the fat that surrounds muscle tissue. An animal uses this layer of fat as an energy source and to keep itself warm. This layer of fat is frequently left on the meat during cooking to keep meat moist and juicy. If there is not a fat cap, barding or larding is a proven alternative to keep meats from drying out during cooking.

With **barding**, you wrap a lean meat with fat, such as bacon, before roasting. A few minutes before doneness, you remove the meat from the oven, unwrap the fat, put the meat back in the oven, and allow the surface of the meat to brown.

❖ Nutrition Notes ❖

Choose Lean Meat

Eating lean meat instead of fatty meat can help decrease cholesterol and saturated fat intake, and decrease the amount of fat that attaches to your arteries. A 1-ounce piece of uncooked, lean meat has 4 to 5 grams of protein. The fattiest meats include beef brisket and pork spare ribs. Veal is one of the leanest types of meat.

CRITICAL THINKING *Based on its effects, how would eating lean meat benefit your health?*

With **larding**, long, thin strips of fat or vegetables are inserted into the center of the lean meat. This adds moisture and can make the final product visually appealing.

Components of Meat

Meat products have three components:

- **Muscle Fibers** You may have heard that leaner cuts of meat have fewer calories. That is because lean meat is almost completely **composed**, or made up, of muscle fibers with little fat. **Muscle fibers** determine meat's texture and contribute to its flavor. Coarsely textured meat such as ham has tough, large fibers. Smooth-textured meat such as beef tenderloin has tender, small fibers.
- **Connective Tissue** Connective tissue connects muscles to bones and binds muscle fibers together. Connective tissue is tough. To cook meats properly, you need to understand how connective tissue functions. Connective tissue is composed of either collagen or elastin. **Collagen** is soft, white tissue that breaks down into gelatin and water during slow, moist cooking processes. **Elastin** is a hard, yellow tissue that does not break down during cooking. Elastin is the tissue some people refer to as gristle. Older animals generally have a lot of elastin. To reduce the effects of elastin, cut it away from the meat.

- **Bones** Bones make up the skeleton of the animal. An older animal has whiter bones, while a younger one has redder bones. Learn the bone structure of an animal to help you identify the different cuts of meat and how they are carved.

Primal Cuts

A **primal cut**, sometimes called a wholesale cut, is a large, primary piece of meat separated from the animal. Primal cuts are the most popular forms of meat purchased by foodservice operations. Although primal cuts are large cuts of meat, they are easily handled and stored.

Fabricated Cuts

A **fabricated cut** is a smaller portion taken from primal cuts. It is a smaller, menu-sized portion of meat. You would likely purchase fabricated cuts if you were planning to serve roasts, stews, or steaks. Purchasing fabricated cuts as exact portions can limit waste. It is good to know how fabricated cuts are made to understand how these cuts should be cooked.

Whole Carcass

The **carcass** is what is left of the whole animal after it has been slaughtered. (See **Figure 23.1** on page 590.) The carcass does not usually include the head, feet, or hide. However, pork can be purchased with the feet and head still attached. Most foodservice establishments do not purchase meat in this form.

Small Bites

Tenderize Meat To tenderize meat that has a lot of connective tissue, try the following techniques:

- Sear and then braise the meat
- Slice it thinly against the grain
- Grind it
- Break down the collagen by adding a chemical tenderizer.

A TASTE OF HISTORY

1906

The Federal Meat Inspection Act is put into effect

1909

William Howard Taft is inaugurated President of the United States

The History of the Butcher

The history of the butcher and meat seller goes back to ancient Rome, where Roman butchers slaughtered and sold meat according to regulations that governed the type of meat each butcher sold. During the Middle Ages, butchers occupied open stalls from which they butchered and sold their wares. This is in sharp contrast to today's meat production, in which animals are slaughtered for meat at large-scale meat-packing operations. Today's butcher operates under a strict set of guidelines for training and operations. On-the-job training is common because simple meat-cutting techniques require only a few days to learn. Complicated tasks, such as eviscerating slaughtered animals, require several months of training.

History Application

The U.S. Department of Agriculture voluntarily grades meat. Write a listing the various grades, the characteristics that determine each grading, and why you feel grading is necessary.

NCSSVB Individuals, Groups, and Institutions Analyze group and institutional influences on people, events, and elements of culture in both historical and contemporary settings.

The labor, equipment, and facilities needed to process a whole carcass are expensive. In addition, many foodservice establishments may not be able to use all parts of a carcass. This results in a waste of food and money.

Cutting the Carcass

Beef carcasses are split into two sides. Each side is divided into a hind and a quarter. In general, veal and lamb carcasses are divided between their last two ribs to create the foresaddle and hindsaddle.

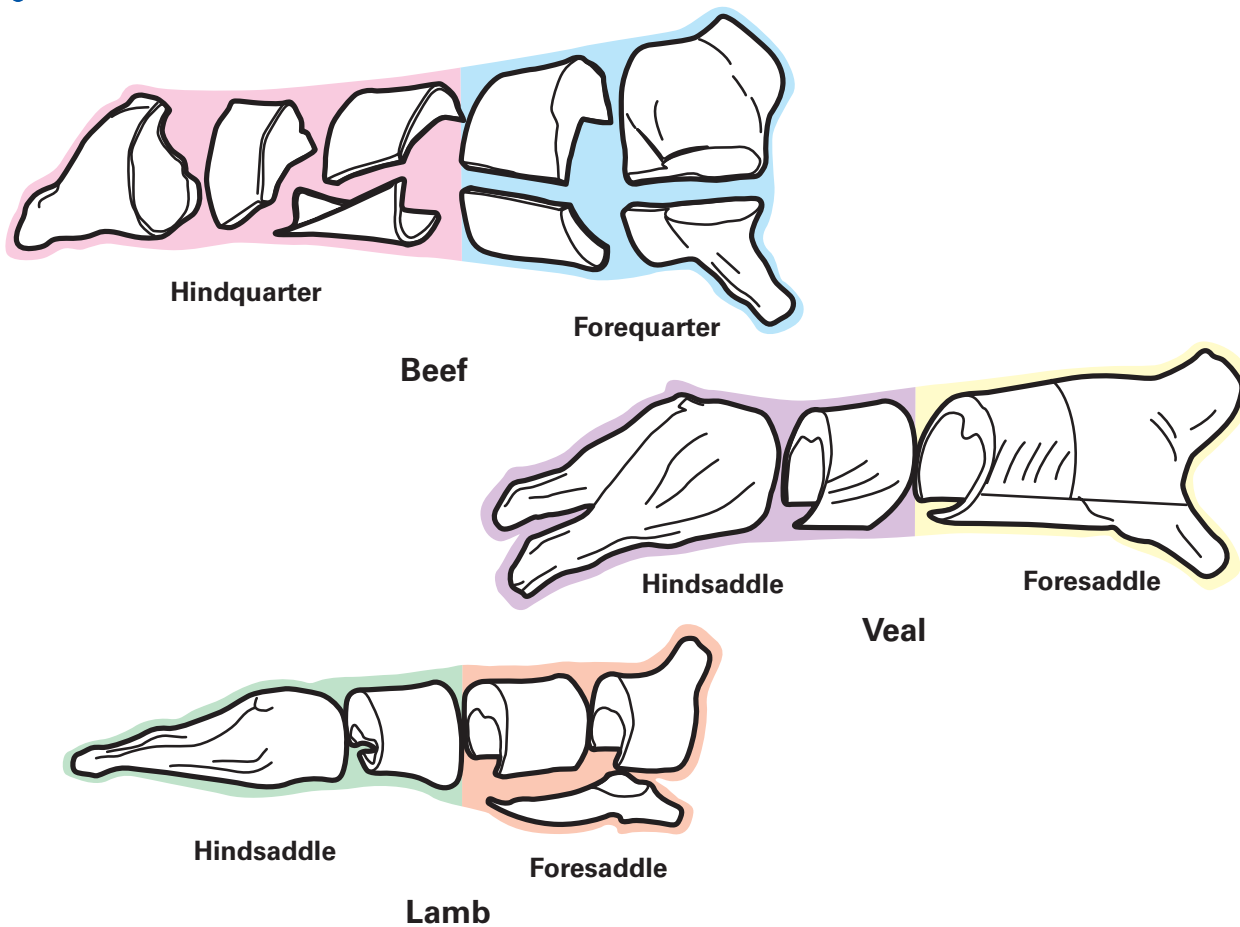


Reading Check Explain How is the size of the muscle fibers related to the texture of the meat?

FIGURE 23.1 Meat Carcasses

Purchase Meat Beef, veal, and lamb carcasses are generally split into two main sections.

Why do most restaurants avoid purchasing whole carcasses for use?



Purchasing Meats

Imagine that you have been given the job of buying meat for your foodservice operation. Where would you begin? What cuts would you ask for? How would you know the quality of the meats? There are several factors to consider when you purchase meat:

- The menu and the meats that will fit those recipes
- The cooking methods to be used
- The price (For example, how much can your customers afford, and how much is your foodservice operation willing to pay for top-quality meats?)
- Quality and value

To assist in making quality meat purchases, many foodservice operations use guides such as *The Meat Buyers Guide*, which is put out by the North American Meat Processors Association. This guide provides Institutional Meat Purchase Specifications (IMPS) for quality meats and photos of various meat cuts to help ensure that meats purchased are consistent in quality and cut. You must be sure to be specific when you place an order. All meats must be purchased from a USDA-approved processing plant.

The storage facilities, the cooking techniques that a facility uses, and the speed with which food must be prepared all affect the selection of types and sizes of meat.

Meat Inspection and Grading

In 1906 under U.S. President Theodore Roosevelt, the U.S. federal government passed the Meat Inspection Act. This law requires the inspection of all meats that are transported across state lines. It also requires the federal government to inspect animals before slaughter and carcasses after slaughter, establishes sanitation standards for meat-processing plants, and allows the government to routinely monitor the activities of these plants. It guarantees that the meat is wholesome, and that the animal was not diseased.

The meat for foodservice operations must have a United States Department of Agriculture (USDA) Inspection Stamp. (See **Figure 23.2**.) The U.S. Food Safety and Inspection Service (FSIS), part of the USDA, is responsible for performing inspections. FSIS checks to make sure that meat is clean, safe to eat, and

properly packaged. Meats that pass inspection are given a USDA stamp made from a harmless vegetable dye so it will not need to be cut off prior to cooking. The USDA stamp will not **reveal**, or make known, anything about the quality or tenderness of the meat. It reveals only that it is fit for human consumption. Since the inspection stamp appears in only a few places on the animal, it is generally only seen on retail cuts of meat.

As with poultry, meat is graded to indicate its quality. (See **Figure 23.3**.) The USDA's grading program is completely voluntary to the meat industry, which pays for the service. This grading is usually done within 24 hours of slaughtering and inspection. Some meat producers and processors use their own criteria to grade meats. This independent grading is often less consistent than the USDA's grading system.

The USDA grading shield stamp indicates how tender and flavorful the meat will be when it is prepared. Meat is graded for both quality and yield. Different types of meat have different criteria, however. A piece of beef is not evaluated for the same features as a piece of mutton. In general, however, USDA graders usually check for:

- Color
- Texture
- Firmness
- Marbling
- Age of the animal

FIGURE 23.2 Inspection Stamps

USDA Inspection All meats that are transported across state lines must be inspected by the USDA. *What do these inspection stamps say about the quality of the meat?*



FIGURE 23.3 Meat Grades

Quality Issues USDA grades indicate the quality of a piece of meat. *What are the differences between prime and choice meat?*

Meat	Quality Grades
Beef	USDA Prime, Choice, Select, Standard, Commercial, Utility, Cutter, Canner.
Pork	Pork is not quality graded because the quality is always uniform.
Veal	USDA Prime, Choice, Good, Standard, Utility.
Lamb	USDA Prime, Choice, Good, Utility.

Small Bites

Kobe Beef The Wagyu cattle from Japan are the source of Kobe beef, an extremely tender, flavorful grade of beef. The cattle are raised under strict conditions, including some that may seem strange, such as consuming beer. However, by USDA standards, Kobe beef would receive the highest yield and grade markings. Kobe beef is very expensive.

Sanitation Check

✓ Prevent Cross-Contamination

When you prepare meats, practice these safety measures to help prevent cross-contamination:

- Store meats separately from other foods.
- Store raw meats below all other foods.
- Prepare meat products in areas separate from other foods.
- Sanitize knives and cutting boards after each use.
- Ground meats should be used more quickly because of possible bacterial contamination.

CRITICAL THINKING *Why are ground meats more susceptible to bacterial contamination?*

Quality Grades

Quality grading is a means to measure differences in the quality of the meat you purchase. This type of grading shows meat's tenderness, juiciness, and flavor. The quality grades are different for each type of meat.

USDA Prime meats are used in the very best foodservice establishments. These meats are also the most expensive. For a meat product to receive a USDA Prime grade, it must have excellent marbling and a thick layer of fat cap. (See **Figure 23.4**.)

The Choice grade is more widely accepted in the foodservice industry. It is the grade most preferred by consumers because of its flavor and tenderness. It is also a great value.

The Select grade has very little marbling. It is usually purchased by foodservice operations concerned about keeping costs down.

▼ **FIGURE 23.4** Meat Grading System

Prime Cuts USDA Prime meats are the highest quality grade sold in the United States. *What grade of meat is the most commonly sold grade in the United States?*



Below the Select grade are the Utility, Cutter, and Canner grades. These are used primarily for processed meat products, such as hamburger patties and luncheon meats.

Yield Grades

A **yield grade** measures the amount of usable meat on beef and lamb. (See **Figure 23.5**.) The best grade is Yield Grade 1, and the lowest is Yield Grade 5. This means that meat that has been marked Yield Grade 1 will contain a good amount of usable muscle. If you purchase a piece of beef that is marked Yield Grade 5, it probably has a large amount of fat and not much muscle.

Meat Handling and Storage

Meat storage requires careful attention. Meat can quickly spoil if it is not properly handled. This can cause food waste, or even possible foodborne illness if the spoiled meat is used.

- **Fresh Meat** Fresh meat should be stored in the refrigerator at 41°F (5°C) or below. Wet-aged meat should remain sealed until the meat is ready for use. Ground meat, such as hamburger, must be wrapped air-tight so that it stays fresh. Place meat on trays so that juices from the meat will not contaminate other foods or the storage unit floors. Store uncooked meats on the lower shelves of the refrigerator, with ground meats shelved below other meats. Raw meats should always be placed on the lowest shelf so that they will not drip.

▼ **FIGURE 23.5** Yield Grades

A Good Yield USDA Yield Grades indicate the amount of usable meat on cuts of beef and lamb. *What does this stamp indicate about meat?*

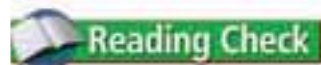


FIGURE 23.6 Meat Storage

Meat Safety Meats can spoil quickly if they are not stored and handled properly. *Why do you think raw meats should be stored on the lowest shelf of the refrigerator?*

Meat Products	Refrigerator	Freezer
Beef, roasts and steaks	2-5 days	6-9 months
Lamb, roasts and steaks	2-5 days	6-9 months
Pork, roasts and chops	2-5 days	4-8 months
Beef and lamb, ground	1-2 days	3-4 months
Pork, sausage	1-2 days	2 months

- **Frozen Meats** To freeze fresh meat, place it in a freezer at 0°F (18°C) or below. Never freeze meat in containers. Always wrap the meat in air-tight, moisture-proof packaging to prevent freezer burn. Freezer burn causes meat to spoil. Labeling and dating packages and following first-in, first-out procedures help avoid food waste caused by spoilage. Meats should always be thawed under refrigeration and never on the counter left at room temperature. (See **Figure 23.6** for how long meats can be kept in storage.)

 **Reading Check** **Determine** Why does meat develop more flavor as it ages?

SECTION 23.1 After You Read

Review Key Concepts

1. **Explain** the purpose of barding and larding.
2. **List** the factors for purchasing meat.

Practice Culinary Academics

English Language Arts

3. Imagine that you are training new employees in a foodservice operation. Create a guide to purchasing meat for them. Include tips, examples of cuts, and information about the structure and qualities of meat.

NCTE 12 Use language to accomplish individual purposes.

Social Studies

4. Many in our society have the luxury of being able to eat only the best cuts of meat. Traditionally, however, people in most cultures would use as much of the animal as possible. Research meat dishes in different cultures that are made from parts of the animal we normally would not often use. Create a visual presentation to show the recipe, and the meat cut it uses.

NCSS 1 B Culture Predict how experiences may be interpreted by people from diverse cultural perspectives and frames of reference.

Mathematics


5. Shandra is preparing veal for the dinner service at the restaurant where she works. To tenderize veal cutlets that are $\frac{3}{8}$ -inch thick, Shandra pounds them to a thickness of $\frac{1}{8}$ inch. What fraction is the new thickness of the original thickness? What percentage is the new thickness of the original thickness?

Math Concept Convert Fractions to Percents

To convert a fraction into a percent, divide the numerator by the denominator, multiply by 100, and add the percent symbol.

Starting Hint The pounded veal is $(\frac{1}{8}) / (\frac{3}{8})$ of the original thickness. Because it is improper to have fractions within a fraction, simplify the fraction by dividing $\frac{1}{8}$ by $\frac{3}{8}$ (which is the same as multiplying $\frac{1}{8}$ by $\frac{8}{3}$). Convert this fraction to a percent.

NCTM Number and Operations Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

 Check your answers at this book's Online Learning Center at glencoe.com.

Meat Cuts

Reading Guide

Before You Read

Take Guilt-Free Days of Rest The reason for resting is to refresh oneself. However, if you feel guilty about resting (“I really should be reading”), then your precious rest period will only create more stress. The brain has a hard time absorbing new data when it is stressed. Your reading skills will be much more effective if you are relaxed and ready to learn.

Read to Learn

Key Concepts

- **Identify** the quality characteristics and cuts of pork.
- **Describe** the quality characteristics and storage of lamb.
- **List** the quality characteristics of veal.
- **Explain** the quality characteristics of beef.

Content Vocabulary

- pork
- processing
- curing
- lamb
- mutton
- veal

Academic Vocabulary

- portion
- resist

Main Idea

Before being shipped, meat is divided into primal cuts. Primal cuts are then further divided into fabricated cuts before they are prepared.

Graphic Organizer

As you read, use a matrix like this one to list the primal cuts for each type of meat.

Primal Cuts

Pork	Lamb	Veal	Beef



Graphic Organizer Go to this book’s Online Learning Center at glencoe.com for a printable graphic organizer.

Can you name the primal and fabricated cuts of meat?

ACADEMIC STANDARDS

Mathematics

NCTM Problem Solving
Solve problems that arise in mathematics and in other contexts.

NCTE National Council of Teachers of English

NCTM National Council of Teachers of Mathematics

NSES National Science Education Standards

NCSS National Council for the Social Studies

Cuts of Pork

Before being shipped to foodservice operations, a meat carcass is usually divided into primal cuts and portioned. (See **Figure 23.7** on page 596.) Primal cuts are easier for foodservice workers to handle. Standards have been established that specify how pork, lamb, veal, and beef should be divided into smaller fabricated cuts. These smaller pieces of meat can be prepared in many different ways. Learning the basic primal and fabricated cuts, the location and shape of the bones, and the characteristics and processes of each kind of meat will prepare you to handle and serve meat correctly.

Pork is the meat from hogs that are less than one year old. There are five different primal pork cuts: loin, picnic shoulder, Boston butt, belly, and fresh ham. The largest primal cut is the loin.

- **Loin** The loin can be divided into several fabricated cuts, such as pork tenderloin, pork chops, and pork back ribs. Pork tenderloin is the most tender cut of pork. The pork chop is a favorite of many customers. The best pork chops are those that are center cut. All loin cuts can be cooked using a variety of cooking methods.
- **Shoulder/Butt** The picnic shoulder is the lower part of the foreleg. It is sometimes called a picnic ham. This part of the shoulder has a higher fat content than other cuts, making it ideal for roasting. The picnic shoulder cut can be cooked using any method. It can be fabricated into fresh and smoked picnic hams. The picnic shoulder also may be boned and cut into smaller pieces, and then sautéed, braised, or stewed. Just above the picnic shoulder is the shoulder butt, or Boston butt. This cut has a high fat content but is very meaty. The Boston butt can be divided into steaks and chops. It can be boned and smoked like a ham.
- **Spareribs/Belly** The pork belly is a primal cut with a high percentage of fat and little

Safety Check

✓ Wear Protective Gloves

Cuts are a common hazard of processing meat, and most cuts occur on the hands. When you cut meats, stainless steel mesh gloves can be used to protect the hands. The gloves have a durable and nonabsorbent outer surface. Gloves should be worn on both hands. Injuries can occur to both the cutting and non-cutting hand. Make sure the gloves that you wear are a good fit.

CRITICAL THINKING *What other injuries might occur while processing meat besides cutting your hand? How can you protect against them?*

lean meat. The fabricated cut is spareribs. Any left over meat is cut for bacon.

- **Ham** The primal cut called the ham is actually a **portion**, or part, of the hind leg. This cut is very large and has lots of muscle and little connective tissue. Fresh ham can be cut with the bone in or boneless, or with the shank removed. The shank of the ham is sometimes called the ham hock.

Quality Characteristics of Pork

Today, pork is much leaner than it once was. Pork can be nearly as lean as skinless chicken. Three ounces of pork tenderloin, the leanest cut, has about 1.4 grams of fat, while a 3-ounce skinless chicken breast has about 0.9 grams of fat.

Uncooked pork should be light pink to red in color, and the fat should be white. There should be no odor. Discard pork that appears brown, green, or purple, or that has black, green, or white spots. This indicates that the pork is spoiled. A slimy feel or a bad odor also indicate spoilage.

Hogs are butchered before they are one year old. This means that they are more tender than older animals. There are many rules and regulations about how hogs are raised and slaughtered that protect both the animals and the public from disease, infection, and contamination.

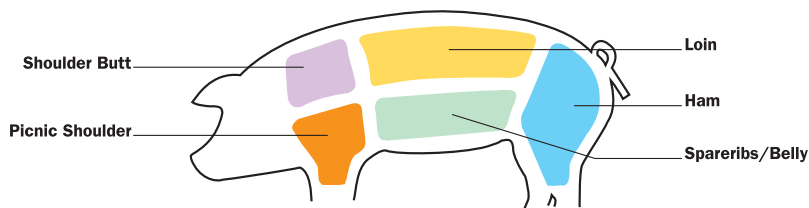
FIGURE 23.7 Foodservice Pork Cuts

Purchase Pork This poster shows the primal and fabricated cuts of pork available to restaurants. *What percentage of these pork cuts will most likely be processed before arriving at a foodservice establishment?*

FOODSERVICE CUTS OF PORK

406 Pork Shoulder, Boston Butt, Bone In	406A Pork Shoulder, Boston Butt, Boneless	1406 Pork Boston Butt Steaks	407 Pork Shoulder Butt, Cellar Trimmed, Boneless
408 Pork Belly	416 Pork Spareribs	416A Pork Spareribs, St. Louis Style	417 Pork Shoulder Hocks (left) 417A Pork Leg (Fresh Ham) Hocks (right)
410 Pork Loin, Bone In	412 Pork Loin, Bone In, Center Cut, 8 Ribs	1412 Pork Loin Chops, Center Cut	1412B Pork Loin Chops, Center Cut, Boneless
413A Pork Loin, Boneless, Roast	414 Pork Loin, Canadian Back	415 Pork Tenderloin	422 Pork Loin, Back Ribs
402A Pork Leg (Fresh Ham), Skinned, Short Shank	402B Pork Leg (Fresh Ham), Boneless	1495 Coarse Chopped Pork	1400 Pork Steak Cubed

The above cuts are a partial representation of NAMP/IMPS items. For further representation and explanation of all cuts see *The Meat Buyers Guide* by the North American Meat Processors Association.



NAMP/IMPS Number (North American Meat Processors Association/Institutional Meat Purchase Specifications)

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Small Bites

Aging of Pork Cured and smoked pork are aged due to processing. Fresh pork is not aged because it is naturally tender.

Processing Pork

While some pork is purchased fresh, such as pork chops, most pork is processed. **Processing** is the act of changing pork by artificial means. When pork is processed and cut to make ham and bacon, it usually is cured, aged, or smoked. Processing may also involve a combination of these three processes. About 70% of the carcass is processed before it ever arrives at a foodservice operation.

Curing and smoking are types of processing. Processing not only changes the flavor of the food, but it also greatly improves its preservation.

Curing Pork

Preserving pork with salt, sugar, spices, flavoring, and nitrites is called **curing**. Ham that has been cured, for example, has a pink color that makes it visually appealing. Cured pork will **resist**, or avoid, spoilage better than fresh pork. It also retains a fresher flavor for a longer period of time.

Curing changes the color and flavor of the pork. The oldest form of curing is dry curing. Seasonings, such as salt, are rubbed on the surface of the pork. Usually the entire surface of the pork is covered and then stored until the seasoning is absorbed into the meat. There are other common forms of curing:

Pickle Curing Pork is submerged in brine, or pickling liquid, until the mix completely penetrates the meat.

Injection Curing Brine is injected directly into the meat.

Sugar Curing Pork is covered with a seasoned, sweet brine that contains brown sugar or molasses.

Smoking

Aged hams are a popular variety of pork. These hams are cured and then smoked. Smoking means exposing the pork to the smoke of fragrant hardwoods, such as hickory.

Irradiation

Outbreaks of foodborne illnesses have made customers more aware about environmental issues and potential health risks. This has led to a change in how meat, particularly pork, is processed.

When pork is irradiated, it is exposed to medium doses of radiation. This process does not cook the meat, but it delays spoilage by destroying cells that cause it. It also greatly enhances food safety. However, irradiation should never replace proper food handling and sanitation techniques.



Reading Check Explain Why is irradiation used to process meat?

Cuts of Lamb




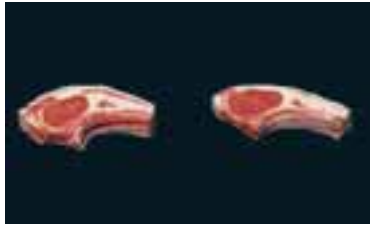
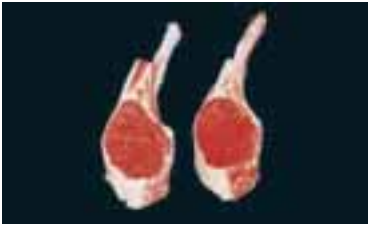
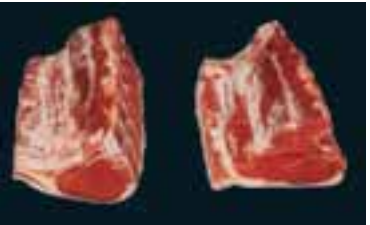






Lamb meat comes from sheep that are less than one year old. Meat from older sheep is called **mutton**, and it is usually tough. The carcass of a lamb is normally divided into the shoulder, shank/breast, rack or rib, loin, and leg. (See **Figure 23.8** on page 598.)

- **Shoulder** The shoulder is a large piece of primal-cut meat that contains rib bones, the arm, blade, neck bones, and muscles. It is difficult to divide the shoulder into fabricated cuts because of the large number of bones and muscles it contains. Either the shoulder is cut into pieces and used for stew, or the meat is ground.
- **Shank/Breast** This primal cut includes the breast and foreshank of the carcass. It is not used often in foodservice. If the breast is used, it is braised either as boneless or bone-in. The foreshank is meatier and can be served as an entrée.

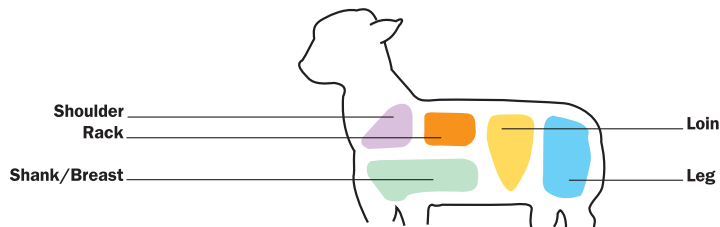
FIGURE 23.8 Foodservice Lamb Cuts

Purchase Lamb This poster shows the most common cuts of lamb. *Which of the cuts pictured here are primal cuts?*

FOODSERVICE CUTS OF LAMB

		
208 Lamb Shoulder, Square Cut, Boneless	1207 Lamb Shoulder Chops	204C Lamb Rack, Roast-Ready, Frenched
		
1204B Lamb Rib Chops	1204D Lamb Rib Chops, Frenched, Special	232 Lamb Loin, Trimmed, Split
		
1232A Lamb Loin Chops	233E Lamb Leg, Steamship, 3/4, Aitch Bone Removed	234 Lamb Leg, Boneless
		
210 Lamb Foreshank	209A Lamb Ribs, Breast Bones Off	295 Lamb for Stewing

The above cuts are a partial representation of NAMP/IMPS items. For further representation and explanation of all cuts see *The Meat Buyers Guide* by the North American Meat Processors Association.



NAMP/IMPS Number (North American Meat Processors Association/Institutional Meat Purchase Specifications)
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- **Rack** The rack is what results from cutting the rib tips in the breast. It is located between the shoulder and the loin and includes eight ribs and some of the backbone. The tender rib-eye muscle is a part of the rack. Fabricated cuts include the lamb rack and rib chops.
- **Loin** The primal cut that comes from the area between the rib and leg is called the loin. It includes a rib and some of the backbone, tenderloin, loin-eye muscle, and flank. Loin meat is generally very tender. Fabricated cuts include boneless roasts and bone-in or boneless chops.
- **Leg** The hind leg of the lamb contains some of the backbone, tail, hip, round, and shank bones. Usually the leg is split and boned before cooking. Sometimes a bone-in leg is roasted or braised. The fabricated cuts are steaks. The leg also can be diced and stewed or ground into patties.

Quality Characteristics of Lamb

The lamb meat purchased by a foodservice operation should have these characteristics:

- Pinkish to deep red color
 - Firm and finely textured
 - Some marbling in its lean areas
- Spoiled lamb may look brown instead of pink, and may have a slimy feel or strange odor. Discard spoiled lamb.

Storing Lamb

Fresh lamb can spoil quickly even when kept in a cooler. Do not exceed these maximum refrigeration storage times:

- Two to five days in the refrigerator at 41°F (5°C) or below
- Six to nine months in the freezer at 0°F (-18°C) or below

 **Reading Check** **Identify** What are the quality characteristics of lamb?

Cuts of Veal

Veal is the meat from calves that are less than nine months old. Some veal is from calves that are only eight to sixteen weeks old. Veal primal cuts include the shoulder, foreshank/breast, rack, loin, and leg. (See **Figure 23.9** on page 600.)

- **Shoulder** The primal shoulder cut includes four rib bones and some of the backbone, blade, and arm bones. Fabricated cuts include steaks and chops, but they are not as tender as those from the loin. Meat from the shoulder is usually braised or stewed.
- **Foreshank/Breast** The shank and breast are one primal cut. It includes rib bones, cartilage, breastbones, and shank bones.
- **Rack** The double rib primal cut is very small, tender, and expensive. The rib cut consists of a double rack of ribs and part of the backbone. Fabricated cuts include whole or halved racks, rib-eye, and chops.
- **Loin** The primal loin cut is located behind the ribs. It consists of the loin eye, the top of the rib bones, and the tenderloin. Fabricated cuts include tenderloin, medallions, and chops.
- **Leg** The primal leg cut includes the leg and the sirloin. The leg is fabricated into scallops and cutlets. The leg also can be cooked whole.

Quality Characteristics of Veal

Veal is delicately flavored and tender. In general, veal should have the following characteristics:

- Firm texture
 - Light pink color
 - Little fat
- Spoiled veal may be sticky or smell odd.

 **Reading Check** **Define** What is veal?

FIGURE 23.9 Foodservice Veal Cuts

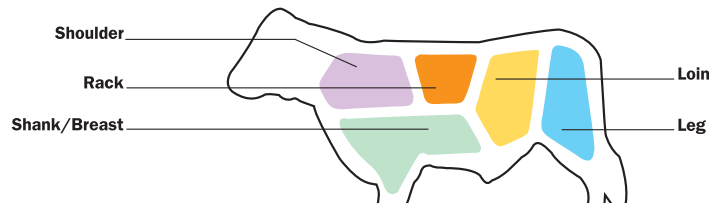
Purchase Veal Primal cuts of veal include the shoulder, shank/breast, rack, loin, and leg.

Why do you think customers might choose veal over beef?

FOODSERVICE CUTS OF VEAL

309D Veal Chuck, Square Cut, 4 Ribs, Neck Off, Boneless	310B Veal Chuck, Shoulder Clod, Roast	306A Veal Hotel Rack, 6 Rib	1306E Veal Rack, Rib Chops, Frenched, 6 Rib	307 Veal Rack, Ribeye, Boneless, 7 Ribs
332 Veal Loins, Trimmed	1332 Veal Loin Chops	344 Veal Loin, Strip Loin, Boneless	346 Veal Leg, Butt Tenderloin, Defatted	363A Veal Leg, TBS, 3 Parts
334 Veal Legs	336 Veal Leg, Shank Off, Boneless, Roast-Ready	1336 Veal Cutlets, Boneless	349A Veal Leg, Top Round, Cap Off	337 Veal Hindshank
312 Veal Foreshank	306E Veal Hotel Rack, Chop-Ready, 6 Ribs, Frenched	1337 Veal Osso Buco, Hindshank	1300 Veal Cubed Steak, Boneless	395A Veal (or Calf) for Kabobs

The above cuts are a partial representation of NAMP/IMPS items. For further representation and explanation of all cuts see *The Meat Buyers Guide* by the North American Meat Processors Association.



NAMP/IMPS Number (North American Meat Processors Association/Institutional Meat Purchase Specifications)
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Tender Cuts Some cuts of beef are tender and juicy. *Why might you serve a tender cut of meat with a sauce?*

Cuts of Beef



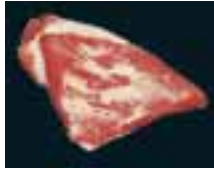
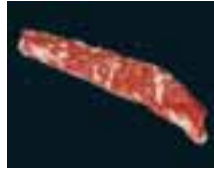
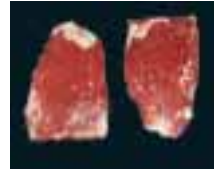

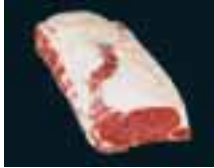


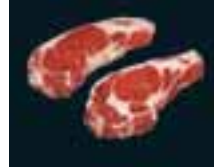




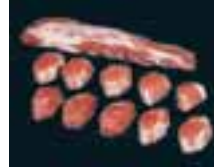



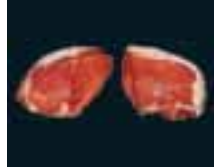

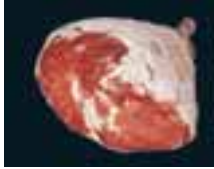




Americans eat more beef than any other kind of meat. The carcass is divided into five primal cuts. (See **Figure 23.10** on page 602.)

- **Chuck** The chuck comes from the shoulder. The chuck contains part of the backbone, rib bones, blade bones, and arm bones. It has quite a bit of flavor, but is tough. Fabricated cuts include ground chuck, stew meat, cube steak, short ribs, and rib pot roast. Chuck is best cooked using a moist heat or combination cooking method.
- **Brisket/Plate/Flank** Brisket is made up of the breast, breastbone, ribs, and arm. The brisket can be salt-cured to make corned beef. The brisket may also be cured to make pastrami. The shank is used in stocks, consommés, and other soups. The plate is located on the side of the beef. It contains rib bones and cartilage. Fabricated cuts include short ribs and skirt steak. Located along the edge of the rib and loin, the flank is a tough, but flavorful, cut of beef.
- Fabricated cuts include London broil and flank steak. The flank can also be ground.
- **Rib** Rib is the primal cut of beef that consists of ribs and some of the backbone. Fabricated cuts include rib-eye roast, rib-eye steaks, rib roast, beef ribs, and beef short ribs.
- **Loin** The loin is the front portion of the beef loin that has a rib and some of the backbone. Short loin includes some of the most tender and expensive parts of the carcass. Fabricated cuts include club steaks, porterhouse steaks, T-bone steaks, filet mignon, and boneless strip loin. The sirloin contains the backbone and some of the hipbone. Fabricated cuts are sirloin roast and sirloin steaks.
- **Round** The round is the large, hind leg. Fabricated cuts include eye of round, outside round, top round, bottom round, knuckle, and shank. The bottom round includes the outside round and the eye of round. These tougher cuts are used for stew beef or braising. The top round is more tender than the bottom, and is usually prepared as a roast.

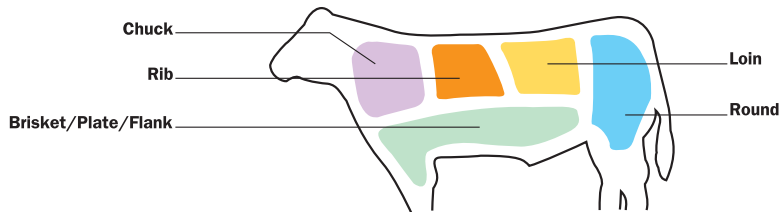
FIGURE 23.10 Foodservice Beef Cuts

Purchase Beef Cuts of beef can be processed in different ways before it arrives at a restaurant. *How does aging beef under refrigeration change the texture of the meat?*

FOODSERVICE CUTS OF BEEF

				
114 Beef Chuck, Shoulder Clod	116A Beef Chuck, Chuck Roll	120 Beef Brisket, Deckle-Off, Boneless	121D Beef Plate, Inside Skirt	193 Beef Flank, Flank Steak
				
109 Beef Rib, Roast-Ready	109D Beef Rib, Roast-Ready Cover Off, Short Cut (Export Style)	112A Beef Rib, Ribeye, Lip-On	1112 Beef Rib, Ribeye Roll Steak, Boneless	1103A Beef Rib, Rib Steak, Boneless
				
180 Beef Loin, Strip Loin, Boneless	1180 Beef Loin, Strip Loin Steak, Boneless	1173 Beef Loin, Porterhouse Steak	189A Beef Loin, Tenderloin, Full, Side Muscle On, Defatted	1189A Beef Loin, Tenderloin Steak, Side Muscle On, Defatted
				
1190A Beef Loin, Tenderloin Steak, Side Muscle Off, Skinned	184D Beef Loin, Top Sirloin, Cap	1185B Beef Loin, Bottom Sirloin, Butt, Ball Tip Steak	169 Beef Round, Top (Inside)	1169 Beef Round, Top (Inside) Round Steak
				
166B Beef Round, Rump and Shank Partially Off, Handle On	170A Beef Round, Bottom (Gooseneck), Heel Out	135A Beef for Stewing	136 Ground Beef	1100 Beef Cubed Steak

The above cuts are a partial representation of NAMP/IMPS items. For further representation and explanation of all cuts see *The Meat Buyers Guide* by the North American Meat Processors Association.



NAMP/IMPS Number (North American Meat Processors Association/Institutional Meat Purchase Specifications)

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Small Bites

What Is in a Burger? Hamburger meat is often labeled as ground beef. It should be ground from fresh beef and should not contain by-products or extenders. If it is labeled as hamburger, it might have beef fat and seasonings added. Both hamburger and ground beef should not contain more than 30% fat.

Quality Characteristics of Beef

When you purchase beef for a foodservice operation, always check for the grade and inspection stamps. The best quality beef will have a bright red color. The meat purchaser will also need to decide on the desired fat thickness for the meat. Fat marbling in beef ranges from slight to moderately abundant.

Processing Beef

Like pork, beef can be processed in several different ways before it arrives at a foodservice operation. The method of processing greatly affects how the beef will taste.

Curing

Beef, like pork, also can be cured and smoked. These processes help increase the shelf life of beef and greatly affect its flavor. Smoking meat will also decrease its surface moisture, helping to prevent bacterial growth.

Aging

Aging beef under refrigeration has long been known to increase its tenderness and enhance its flavor. Aging beef is hung in a controlled environment, such as a meat locker, with strict humidity and temperature conditions. Under these conditions, the meat fibers begin to break down, tenderizing and flavoring the meat.

Irradiation

Beef can also be irradiated to kill microorganisms. Although irradiated beef has far fewer microorganisms, such as *E. coli* bacteria, it still must be refrigerated and carefully stored to prevent cross-contamination. Irradiated beef also has a longer shelf life.

 **Reading Check** **Determine** What is the purpose of aging beef?

SECTION 23.2

After You Read

Review Key Concepts

1. **Describe** the different ways that pork can be processed.
2. **Identify** the primal cuts of lamb.
3. **List** the primal cuts of veal.
4. **Explain** what a chuck is and describe its characteristics.

Practice Culinary Academics



Mathematics

5. The Big Steak Restaurant is offering a free steak to customers as a promotion, while supplies last. The restaurant has 72 ounces of steak to give away. If customers eat half the steak in the first 2 hours, $\frac{2}{3}$ of what is remaining in the next 2 hours, and $\frac{1}{3}$ of what is left in the next 2 hours, how much is left at the end of the night?

Math Concept

Multiplying Fractions

To multiply fractions, simply multiply all numerators to find the new numerator, then multiply all denominators to find the new denominator. Reduce the answer to lowest terms.

Starting Hint Subtract each fraction from 1 to find the fraction uneaten (rather than eaten) during each segment. Multiply the fractions together to find the total fraction uneaten, then multiply by 72 ounces to find the amount left.

NCTM Problem Solving Solve problems that arise in mathematics and in other contexts.



Check your answers at this book's Online Learning Center at glencoe.com.

Principles of Cooking Meat

Reading Guide

Before You Read

Two-Column Notes Two-column notes are a useful way to study and organize what you have read. Divide a piece of paper into two columns. In the left column, write down main ideas. In the right column, list supporting ideas.

Read to Learn

Key Concepts

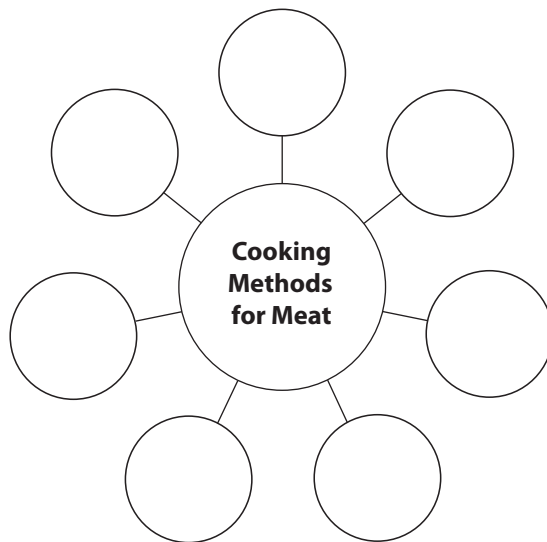
- **Demonstrate** different cooking methods used for meats.


Main Idea

A foodservice employee must fully understand meat cooking techniques. Meat is expensive and the operation will lose money if it is improperly cooked.

Graphic Organizer

As you read, use a web diagram like this one to list the seven different methods used to cook meat.



 **Graphic Organizer** Go to this book's Online Learning Center at glencoe.com for a printable graphic organizer.

There are a variety of different ways to cook meat.

ACADEMIC STANDARDS

English Language Arts

NCTE 4 Use written language to communicate effectively.

Mathematics

NCTM Measurement Understand measurable attributes of objects and the units, systems, and processes of measurement.

Science

NSES B Develop an understanding of chemical reactions.

Social Studies

NCSS VIII B Science, Technology, and Society Make judgments about how science and technology have transformed the physical world and human society.

NCTE National Council of Teachers of English

NCTM National Council of Teachers of Mathematics

NSES National Science Education Standards

NCSS National Council for the Social Studies

Cooking for Tenderness

Meat is one of the highest expenses for foodservice operations. Selecting the right cuts of meat is just the first step. To get the most value for its money and to **satisfy**, or fill, customers' appetites, a foodservice operation must fully understand cooking techniques for meat. Tender cuts of meat become tough when they are cooked improperly. Likewise, tough cuts of meat can become tender when they are cooked correctly. Meat can be delicious and nutritious, but only when it is properly prepared.

If you have ever eaten a burned hamburger, you know what overcooking does to meat. Some dry cooking techniques will firm proteins without breaking down connective tissue. This makes meat tough. You would not want to use a dry cooking technique with a less-tender piece of meat that has a lot of connective tissue. A better choice would be a moist cooking technique. This exposes the meat to moisture and heat during cooking. Moist cooking helps to break down the connective tissue and tenderize the meat.

High-Heat and Low-Heat Cooking

The temperature of the heat source has an important effect on how meat is cooked and how the final product will taste. High-heat cooking can toughen proteins and dry out meat over extended periods of time. However, high heat, when used correctly, can result in an excellent final product. **High-heat cooking**, such as broiling and grilling, is used for tender cuts of meat like tenderloins and strip steaks.

Low-heat cooking is the best method for preparing large cuts of meat, such as top round. Low-heat cooking does not shrink the meat because moist heat, in the form of steam or liquid, penetrates the meat more quickly than dry heat. However, many restaurants use cuts of meat that do not require long cooking times.

Pay close attention to how much fat a cut of meat has prior to cooking. A meat's fat **content**, or amount, will affect the cooking technique. In general, if a meat is high in fat, do not add additional fat while you cook. Adding fat will make the final product oily or greasy.



Meat Cooking Methods Use the cooking technique that is right for the cut of meat you are preparing. *What would happen if you improperly cooked a tender piece of meat?*



Barding Meat Barding involves wrapping meat with fat before cooking. *What cuts of meat would benefit most from barding?*

Fat can be added for meats that are low in fat, such as veal. Veal roasts could be barded or larded. Marinades can add fat to lower-fat meats. You can also add a small amount of fat to the cooking pan. This will help prevent the meat from drying out.

Roasting Meats

Remember that roasting is a dry technique that uses hot, dry air to cook the food. To roast meat, season it and then place it in a hot oven. Roasted meats do not use water or other liquids and are not generally covered during the cooking process. It is helpful to baste the meat with its natural juices or a flavorful seasoned stock. This keeps the meat from drying out.

Whether you use barding or the meat's own layer of fat, lay the meat fat side up for cooking. This way the fat will naturally baste the meat and keep it moist.

To help enhance the meat's flavor and retain moisture, chefs often bard the meat when they roast it. Barding involves wrapping meat with fat, such as bacon, prior to cooking. Tie the fat to the meat with butcher's twine. A few minutes before the meat is done, remove the fat and allow the surface of the meat to brown.

Seasoning meats that will be roasted can be tricky. Salt cannot simply be added to the meat before the meat is roasted because the salt will not penetrate the meat during cooking. To season meat that will be roasted, follow these tips:

- Trim any heavy fat covering, leaving a thin fat layer. This will help the seasoning penetrate the meat.
- Season the meat several hours prior to roasting. This may mean adding seasonings to the surface of the meat, larding the meat with strips of fat, or inserting seasonings, such as garlic or cloves.
- Season the meat again after it is done.
- Season the meat's juices and serve them with the meat.

Sauces and gravies add flavor and moisture to roasted meats. Sauces can be made from meat drippings. It is especially important to add sauce or gravy if the meat is well done. To make a rich gravy, deglaze the roasting pan and combine the drippings with a thickening agent and a demi-glace, or a concentrated brown stock that has been reduced. (For more on how to make and use stocks and sauces, see Chapter 20.)

Carving Roasted Meats

Carving roasted meats correctly is an important final step to serving an appetizing roast meat dish. Incorrectly carving meat can cause well-roasted meat to taste dry and tough. Allow the meat to rest before carving. To **rest** means to allow meat to sit so that juices redistribute throughout the meat. This makes it easier to slice the meat, and keeps the meat moist.

Always carve against the grain. **Grain** is the direction of muscle fibers, or treads, in meat. This means to cut against the muscle fiber structure of the meat. If the meat is sliced along the muscle fiber structure, it will be tough and stringy. Cut across muscle fibers instead.

Science à la Carte

The Maillard Reactions

When meat is braised, it is often first grilled or pan-fried in a skillet at a high temperature, above 285°F (141°C). Doing this allows the meat to undergo a series of reactions involving its sugars and proteins. These are called the Maillard reactions, named after Dr. L.C. Maillard, an early 20th-century chemist. The Maillard reactions help develop the flavor, outer texture, and color of meat.

There are three conditions necessary for a Maillard reaction:

- A nonacidic, or base, environment (pH higher than 7).
- Enough protein, and therefore enough amino acids, in the meat.
- Meat carbohydrates combined with the amino acid from a protein.

Procedure

Prepare two pork chops. Grill or pan-fry one pork chop to medium well, and braise the other to medium well. Compare the results.

Analysis

Which pork chop is crispier? Which pork chop has a darker color? Why did the cooking methods result in two different outcomes? Use your findings to write instructions for preparing a brown, crispy, and well-cooked pork chop.

NSES B Develop an understanding of chemical reactions.

Broiling and Grilling Meats

Two other dry cooking techniques, broiling and grilling, or barbecuing, are popular ways to prepare meats. Broiling and grilling use high temperatures and relatively fast cooking times. Broiled and grilled meats are usually cooked to rare or medium with a browned, crusty surface and a tender, juicy interior. Barbecuing uses low heat and slow cooking times. Restaurants that serve meat rare must have a warning on the menu about undercooked meat and the possibility of bacteria.

Remember these tips when you broil and grill:

- The shorter the cooking time, the higher the heat needed.
- The thicker the cut, the longer the cooking time needed.
- Set the grill controls for different temperatures across the surface of the commercial grill.
- Vary the cooking temperature by moving the meat to different areas of the grill, depending upon the heat needed.
- When you grill red meats, make sure the heat is high enough so that the surface becomes brown and crispy.
- To create cross-hatch grill marks, or grill lines, place the presentation side of the meat down on the grill. Cook long enough for the grill lines to show. Then, rotate the meat about 90 degrees to form the additional grill lines.

Seasoning

Seasoning meats that will be broiled or grilled rather than roasted is best done just prior to cooking them. Meats that tend to become dry when broiled or grilled, such as veal or pork, may be marinated or served with seasoned butter. Meats can be placed in marinades minutes or hours before cooking. Spice rubs can also be used to season meats. A **spice rub** is a mixture of ground spices that is rubbed on raw food before it is cooked.

Sauces and Accompaniments

Butter sauces, such as Béarnaise, and brown sauces, such as mushroom, are excellent additions to meat dishes. Sauces are usually served in a separate bowl, next to the meat, under the meat, or drizzled over the meat on a dinner plate. Most sauces are made before broiling or grilling and do not use juices from the meat itself.

Other accompaniments include vegetables, such as green beans and potatoes. These can be an excellent addition to the meal if they are grilled or broiled. However, you should remember that a meal could become less interesting when all the foods are cooked using the same technique.

Sautéing and Pan-Frying Meats

Tender cuts of meat and thin pieces of meat are usually sautéed. Meats that contain bones or breaded meats are pan-fried. Both cooking techniques require you to pay attention to the amount of heat and fat you use.

Follow these tips:

- Heat the pan before adding the fat.

- Use the correct amount of oil called for in the recipe. It should be enough to evenly cook all surfaces.
- Never overcrowd the pan.
- Turn or move the meat as little as possible.
- Avoid using unclarified butter because it burns easily.

Seasoning

The sauces that accompany sautéed or pan-fried meats will greatly enhance their flavor. A variety of sauces will bring out the flavors of meat cooked with these techniques.

You might also want to marinate the meat before cooking it. If so, make sure to thoroughly pat the meat dry before cooking it, or it will not brown correctly.

Use of Fat

The amount of fat used in sautéing and pan-frying differs. To sauté, use a small amount of fat and heat it until it is very hot before you add the meat. The amount of fat used depends on the amount of meat sautéed. The reason such a small amount is needed is that all surface areas of the meat will touch the pan.



Meat Accompaniments
Flavorful accompaniments are usually served with broiled or grilled meat, like this veal chop. *What accompaniments do you think could be served with broiled or grilled meats?*

Sanitation Check

✓ Meat Temperature

Always use a meat thermometer to measure the internal temperature of meat. A meat thermometer can help you prevent foodborne illness, prevent overcooking, and hold foods at a safe temperature. Completely clean and sanitize the thermometer after each use to avoid cross-contamination.

CRITICAL THINKING *How can using a meat thermometer help you prevent foodborne illness?*

To pan fry, use a moderate amount of fat in a pan, and heat it until it is hot before you add the meat. To evenly brown the meat, use enough fat to conduct heat to the meat's surfaces. Flat meats do not require as much fat as unevenly-shaped meats. You may have to lower the heat a bit to fully cook the product without burning the outside.

Braising and Stewing Meats

Braising and stewing are both combination techniques that begin by browning the food using dry heat. Braising involves partially covering the meat with liquid and cooking until tender. You may decide to cover the pan while the food cooks. During stewing, the liquid completely covers the meat. Both methods finish cooking by simmering in a liquid. The liquid used in both of these cooking methods is extremely important to the success of the final dish.

To begin the braising or stewing process, first season the meat. Avoid using large amounts of salt, because this will slow the browning process. Many chefs marinate meat for several hours or even a whole day before braising or stewing.

Use these tips to braise or stew meat:

- Pat the meat dry prior to browning, especially if it has been marinated.
- Dredge the meat in flour just before cooking to improve browning.
- Do not use more liquid than is necessary.
- When meat is done, it should be fork tender.

Determine Doneness

Most people are particular about how they like their meat cooked. The difference between meat that is well done and meat that is rare can be considerable.

A meat's doneness depends on:

- The cooking method
- The size and type of meat
- The internal temperature of the meat
- The color of the meat
- The amount of time the meat is cooked

Internal Temperature

The best way to test a meat's doneness is to test its internal temperature. Follow these rules:

- Insert the thermometer at an angle, into the thickest part of the meat.
- Avoid taking the temperature in fatty areas.
- Avoid touching or getting near bone with the thermometer.
- Meat is done when it reaches its proper internal temperature, and held at that temperature for at least 15 seconds.

Pork must be cooked to the correct internal temperature. To kill parasites, cook pork to an internal temperature of 145°F (63°C) for 15 seconds. If pork is not cooked correctly, your customers could contract trichinosis (tri-kə-'nō-səs). **Trichinosis** is an infestation by a parasite that can cause muscular pain, stomach upset, fever, weakness, and swelling.

Although many people enjoy eating beef and lamb rare, there is a risk of foodborne illness when meat is cooked at low internal temperatures. Steaks/chops should be cooked to an internal temperature of 145°F (63°C) and held at this temperature for at least 15 seconds. Ground beef should be cooked to 155°F (68°C) and held at that temperature for 15 seconds.

Many states require restaurants to warn their customers of the danger of eating undercooked meats by including a disclaimer on the menu. Check with your local and state health departments for further guidelines.

Color

The color of meat changes when it is cooked. Learning what the colors indicate helps to determine when a particular type of meat product is done. Red meat starts red and changes to gray as the product cooks. Light meat turns pink and changes to white and then to tan as it cooks. Pork and veal become white to tan in color when cooked. It is important to remember that color is not the same as internal temperature.

- **Rare** meat is browned on the surface, with a red center. A thin outer layer of cooked meat appears gray.

- **Medium rare** meat is browned on the surface with a thicker outer layer of gray and a red to slightly pink center.
- **Medium** meat is browned on the surface with an even thicker outer layer of gray and a pink center.
- **Medium well** meat is browned on the surface with a thick outer layer of gray and a center that is barely pink.
- **Well done** meat is browned on the surface and gray on the inside.



Reading Check

Compare How do high-heat cooking and low-heat cooking affect meat?

SECTION 23.3



After You Read

Review Key Concepts

1. **Demonstrate** how to determine the doneness of meat.

Practice Culinary Academics



English Language Arts

2. Create a cooking guide for meat. Include instructions and illustrations for cooking meat, including general tips and specific guidelines for different cooking methods.

NCTE 4 Use written language to communicate effectively.



Social Studies

3. A method of cooking meat that is gaining popularity is sous vide. Sous vide involves placing meat in airtight bags and cooking for an extended period of time at relatively low temperatures. Research sous vide and explain its developments. Write a summary with the pros and cons of this method.

NCSS VIII B Science, Technology, and Society Make judgments about how science and technology have transformed the physical world and human society.



Science

4. **Procedure** Put a teaspoon of corn syrup in a nonstick skillet. Open an amino acid caplet from a health food store and smell the powder inside. Pour the amino acid in the skillet and turn the heat to high. Move the skillet back and forth to disperse the powder.

Analysis Notice the different odors and colors as the mixture heats. Write a paragraph describing them.

NSES B Develop an understanding of chemical reactions.



Mathematics

5. Marco finds an old recipe with temperatures given in degrees Celsius. To what internal temperature should he cook pork? If he cooks a hamburger to 70°C, is that a safe temperature?

Math Concept Converting Temperatures

Convert temperatures from Fahrenheit (F) to Celsius (C) using the formula $C = (F - 32) \times \frac{5}{9}$. To convert °C to °F, use the formula $F = (\frac{9}{5} \times C) + 32$.

Starting Hint Remember, pork should be cooked to an internal temperature of 145°F. Convert this temperature to °C using the correct formula. Convert 70°C to °F using the correct formula, and determine if it is the correct temperature for ground beef.

NCTM Measurement Understand measurable attributes of objects and the units, systems, and processes of measurement.



Check your answers at this book's Online Learning Center at glencoe.com.

Chapter Summary

Meats can be purchased in the form of primal cuts or fabricated cuts. Primal cuts of pork, lamb, veal, and beef are then divided into fabricated cuts for ease of handling and preparation. To buy the highest quality of pork, lamb, veal, or beef, look for the quality characteristics for each type of meat.

Using the correct method to cook meat can enhance its flavor and tenderize it. The doneness of meat depends on the cooking method, the type and cut of meat, the internal color and temperature, and the customer's preferences. Meat may be rare, medium rare, medium, medium well, or well done.

Content and Academic Vocabulary Review

1. Create multiple-choice test questions for each content and academic vocabulary term.

Content Vocabulary

- meat (p. 588)
- marbling (p. 588)
- fat cap (p. 588)
- barding (p. 588)
- larding (p. 588)
- muscle fibers (p. 588)
- collagen (p. 588)
- elastin (p. 588)
- primal cut (p. 589)
- fabricated cut (p. 589)
- carcass (p. 589)
- yield grade (p. 592)
- pork (p. 595)

- processing (p. 597)
- curing (p. 597)
- lamb (p. 597)
- mutton (p. 597)
- veal (p. 599)
- high-heat cooking (p. 605)
- low-heat cooking (p. 605)
- rest (p. 607)
- grain (p. 607)
- spice rub (p. 607)
- trichinosis (p. 609)
- rare (p. 610)
- medium rare (p. 610)
- medium (p. 610)

- medium well (p. 610)
- well done (p. 610)

Academic Vocabulary

- composed (p. 588)
- reveal (p. 591)
- portion (p. 595)
- resist (p. 597)
- satisfy (p. 605)
- content (p. 605)

Review Key Concepts

2. **Identify** the structure and cuts of meat.
3. **Summarize** the details of meat inspection, grading, handling, and storage.
4. **Identify** the quality characteristics and cuts of pork.
5. **Describe** the quality characteristics and storage of lamb.
6. **List** the quality characteristics of veal.
7. **Explain** the quality characteristics of beef.
8. **Demonstrate** different cooking methods used for meats.

Critical Thinking

9. **Imagine** that you have purchased some fresh meat and are storing it in the refrigerator. You check on it and notice that it is discolored. What could be the cause of this?
10. **Analyze** meat cooking methods. A sirloin steak weighs 16 ounces before it is cooked, and 14 ounces after it is cooked. Which cooking method do you think was used and why?

Academic Skills

**English Language Arts**

- 11. Design a Menu** Use the Internet to find creative menu items that feature meat, or create your own meat dishes using the cooking techniques described in this chapter. Then, design a menu that includes an appetizer, a soup, a salad, a sandwich, and an entrée. Choose a creative design for the menu that reflects the character of a restaurant that would serve the dishes you have chosen.

NCTE 12 Use language to accomplish individual purposes.

**Social Studies**

- 12. Humane Farming** One of the dilemmas facing foodservice employees today is choosing meat that is humanely raised. Research national, regional, or local community organizations that deal with the issue of humane treatment of farm animals. Interview a person there about this issue. Take notes during your interview, and give a five-minute presentation on your notes. After the presentations have been given, discuss the issues as a class.

NCSSX J Civic Ideals and Practices Participate in activities to strengthen the “common good,” based upon careful evaluation of possible options for citizen action.

**Mathematics**

- 13. Source Beef** Juan’s restaurant sells $\frac{1}{4}$ -pound hamburgers. He can buy pre-formed hamburger patties in a pack of 50 for \$44.99. His supplier also offers a 10-pound package of ground beef for \$32.99. As a third alternative, Juan can buy a 3-pound package of beef chuck for \$8.99. Juan’s employee makes \$12 per hour. She can form 200 hamburger patties in an hour, and can grind 120 pounds of beef chuck in an hour. Which option is least expensive for Juan?

Math Concept Comparing Costs When comparing costs, all costs must represent the same unit of measurement. For example, it is not possible to make a direct comparison between \$5 per pound and \$3 per item. But if you know the weight of each item, it is possible to convert the prices to the same units, using ratios.

Starting Hint In each of the three cases, use the cost of producing one hamburger as your unit of comparison. Include labor costs if necessary. For the ground beef, since you know that \$32.99 buys 10 pounds, set up a proportion to find the cost of $\frac{1}{4}$ pound: $\$32.99 / 10 = x / 0.25$. Add the cost of forming one hamburger patty (which you can find by setting up another proportion: $\$12 / 200 = x / 1$).

NCTM Number and Operations Compute fluently and make reasonable estimates.


Certification Prep

Directions Read the questions. Then, read the answer choices and choose the best possible answer for each.

- 14.** Which grade of beef is most commonly used in restaurants?
- | | |
|-----------|-------------|
| a. prime | c. select |
| b. choice | d. standard |
- 15.** What primal cut produces a filet mignon of beef?
- | | |
|------------|---------|
| a. chuck | c. rib |
| b. brisket | d. loin |

Sharpen your test-taking skills to improve your kitchen certification program score.

Test-Taking Tip

Pay attention to the instructions given on the correct writing utensil to use. Some machine-graded tests can only be taken with a No. 2 pencil.

Real-World Skills and Applications

Critical Thinking Skills

- 16. Work with Limited Resources** Your normal dinner service includes an entrée that uses 5 pounds of beef loin on average per night. For tonight's service you have only 3 pounds of beef loin, and the new order will not arrive until tomorrow. What are your options? Write a paragraph to explain your choices, and why you made them.

Interpersonal and Collaborative Skills

- 17. Keep Meat Safe** Divide into small groups at the instruction of your teacher. Imagine that you are caterers who are catering a dinner for 100 people. Your entrée will be a beef lasagna. Identify food safety issues for purchasing, storing, preparing, cooking, and serving the beef lasagna. Discuss each team's answers as a class.

Technology Applications

- 18. Make a Video** Create a two- to five-minute video that shows viewers how to check the doneness of meat. In the audio, explain what you are doing and why, and the correct temperatures to check for. Remember to explain the tools you are using and show in detail how to use them.

Financial Literacy

- 19. Stretch the Food Dollar** Pork loin is \$7.99 per pound. You have 10 pounds of pork loin. Your pork loin entrée uses 8 ounces of pork. You have reservations for 80 people. You can either purchase 10 more pounds of pork, or reduce the serving size to 4 ounces and add extra rice and vegetables for \$1.50 per plate. Compare the cost of each option.

Culinary Lab



Use the culinary skills you have learned in this chapter.

Prepare Quality Meats

- 20. Prepare a Beef Dish** At your teacher's instruction, you will divide into teams and plan and prepare a beef dish, then evaluate each team's dish.
- A. Choose a recipe.** Working with your team, choose a beef dish to prepare.
 - B. Choose a meat cut.** Choose the best cut of meat by looking for marbling; small, tender fibers; and a red color.
 - C. Cook your dish.** Choose a cooking method for your type of meat and prepare accordingly. Cook the beef and share your finished product with the class. Explain why you chose a particular cooking method.
 - D. Evaluate your dishes.** Evaluate each team's meat dish according to the instructions below.

Create Your Evaluation

Use the following rating scale to judge the quality of each team's dish: 1=Poor; 2=Fair; 3=Good; 4=Great. Evaluate the meat on:

- **Appearance** (Is it cooked to appropriate doneness, and plated and garnished well?)
- **Flavor** (Is the flavor appropriate to the preparation method and food product?)
- **Texture** (Is the meat tender, moist, and juicy?)