Introduce Yourself  A new grocery store has opened in your neighborhood. The shop is hiring, and you are interested in a job. Write a cover letter to the shop’s manager in which you tell her about yourself and describe the skills you can offer as an employee.

Writing Tips  Follow these steps to write a cover letter:
- Include a return-address heading, the date, recipient’s address, and salutation, or greeting.
- Make sure your writing has a professional tone.
- End your letter with a closing and your name.
- Proofread the letter to make sure it is free from errors.

Activate Prior Knowledge  Meat as the Centerpiece  Meat is the center of many meals. What is the nutritional benefit of combining a kebab with rice and tomatoes?
Before You Read

Preview Examine the photos, figures and captions. Consider the variety of meat types, cuts, and cooking methods.

Read to Learn

Key Concepts
- Explain the three main parts of meat.
- Describe the nutritional value of meat.
- Identify and explain the most common grades of beef.
- Explain what to look for when buying meat.
- List methods for cooking meat.

Main Idea
Meat is a flavorful, versatile, and nutritious food that comes in a variety of forms and can be prepared in many ways.

Content Vocabulary
You will find definitions for these words in the glossary at the back of this book.
- meat
- muscle
- grain
- connective tissue
- collagen
- elastin
- marbling
- cut
- wholesale cut
- retail cut
- variety meat
- processed meat
- cold cuts
- doneness

Academic Vocabulary
You will find these words in your reading and on your tests. Use the glossary to look up their definitions if necessary.
- similar
- uniform

Graphic Organizer
Use a graphic organizer like the one below to take notes about the four most common meats sold in the United States.

<table>
<thead>
<tr>
<th>BEEF</th>
<th>VEAL</th>
<th>LAMB</th>
<th>PORK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Graphic Organizer Go to this book's Online Learning Center at glencoe.com to print out this graphic organizer.

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.

Science
NSES A Develop understandings about scientific inquiry.

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
Makeup of Meat

Meat is flavorful, versatile, and highly nutritious. Meat is the edible muscle of animals, typically cattle, sheep, and pigs.

Meat has three main parts: muscle, connective tissue, and fat. Figure 34.1 shows the structure of muscle tissue.

Muscle Sometimes called muscle fibers, muscle is protein-rich tissue made of long, thin cells grouped together in bundles. As bundles group together, they form individual muscles. The lengthwise direction of muscle is called the grain. If you cut meat across the grain, you break up the muscle fibers, making it easier to chew. Most meats sold in retail stores are cut across the grain.

Connective Tissue The protein material that binds muscle together into bundles is called connective tissue. This tissue not only holds muscle fibers together but also anchors muscle to bone. Meat has several types of connective tissue, including collagen and elastin. Collagen (kə-lā′jən) is the thin, white, transparent connective tissue found in tendons, between muscle cells, and between muscles.

When cooked in moist heat, collagen softens and turns into gelatin. Elastin (i′las-tan) is the tough, elastic, and yellowish connective tissue found in ligaments and blood vessel walls. It cannot be softened by heat and is usually cut away before cooking. To tenderize elastin, you must pound, cut, or grind it.

Fat In addition to muscle and connective tissue, meat contains both visible and invisible fat. A layer of visible fat sometimes surrounds the muscle. Small white flecks of fat, called marbling, may also appear within the muscle tissue. Invisible fat is part of the chemical composition of meat.

True or False Cutting meat in the direction of the grain makes it easier to chew.

Nutrients in Meat

Meat is an excellent source of protein. It is also a major source of iron, zinc, phosphorus, thiamin, riboflavin, niacin, and vitamins B₆ and B₁₂. Meat can be high in saturated fat, however, so choose lean meats when possible.

Meat belongs to the same food group as poultry, fish, dry beans, eggs, and nuts. Teens need 5 to 6 ounces of these protein foods each day. Two to 3 ounces of cooked meat is about the size of your palm.

Types and Cuts of Meat

The four most common meats sold in the United States are beef, veal, lamb, and pork. Figure 34.2 shows the sources and characteristics of different types of meat.

Cuts of Meat

A cut is a specific, edible part of meat, such as a steak, chop, or roast. Meat is first divided into large wholesale cuts, also called primal cuts. A wholesale cut is a large cut that is sold to retail stores. Figure 34.3 shows the wholesale cuts of beef, veal, lamb, and pork. The retailer divides wholesale cuts into retail cuts.
**Figure 34.2** Types of Meat

**Common Meats** Different types of meat come from different animals, as well as animals of different ages. *How do beef, veal, and baby beef differ in flavor?*

<table>
<thead>
<tr>
<th>Meat</th>
<th>Source</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>Cattle more than one year old.</td>
<td>Hearty flavor; firm texture; bright, deep red color with firm, creamy white fat.</td>
</tr>
<tr>
<td>Veal</td>
<td>Calves (young cattle), usually one to three months old.</td>
<td>Mild flavor; firm texture; light, gray-pink color with very little fat.</td>
</tr>
<tr>
<td>Baby beef</td>
<td>Calves between six and twelve months old.</td>
<td>Pink-red color; stronger flavor and coarser texture than veal.</td>
</tr>
<tr>
<td>Lamb</td>
<td>Sheep less than a year old.</td>
<td>Unique, mild flavor; bright, pink-red color; brittle white fat. Sometimes covered with a fell, a thin membrane under the hide, which helps retain juices during cooking.</td>
</tr>
<tr>
<td>Mutton</td>
<td>Sheep over two years old.</td>
<td>Less tender than lamb; stronger flavor.</td>
</tr>
<tr>
<td>Pork</td>
<td>Pigs less than a year old.</td>
<td>Tender texture; mild flavor; gray-pink color; soft white fat. Older animals have meat with a darker pink color.</td>
</tr>
</tbody>
</table>

**Figure 34.3** Wholesale Cuts of Meat

**Primal Cuts** Different types of meat are cut into different wholesale cuts. Learning the names of the wholesale cuts can help you buy the right meat for your purpose. *What is meat from the beef shoulder called? What is meat from the beef leg called?*
A retail cut is the small cut of meat sold to consumers. For example, one wholesale cut of beef is chuck, from the shoulder area. Retail cuts from chuck include blade roast, short ribs, and arm pot roast. Meat cuts from the same location in beef, veal, lamb, and pork are usually similar, or alike, in shape but different in size.

The price label on a meat package identifies the cut. The meat type is listed first. The wholesale cut is listed second. This tells you which part of the animal the meat came from. The retail cut is listed third. Figure 34.4 shows a sample meat label.

**Inspection and Grading of Meat**

The Federal Meat Inspection Act requires that all meat shipped across state lines be inspected for wholesomeness, or healthfulness before and after they are slaughtered. States have similar laws that apply to meat sold within a state. Meat products that pass federal inspection standards are marked with a stamp. The stamp appears in only a few places on the animal.

The USDA also grades meat. Inspection is mandatory, but grading is a voluntary program available to the meat industry, which pays for the service. Meat is graded according to standards that include the amount of meat on the animal, the amount of marbling, the age of the animal, and the texture and appearance of the meat. The grade is stamped on the meat. Both inspection and grade marks are stamped with a harmless vegetable dye, so they do not have to be cut off before cooking.

Lamb, veal, and beef are graded with the same grades with one exception: “good” veal and lamb are the same as “select” beef. Pork is not graded because the meat is more uniform, or consistent, in quality.

Prime beef is the highest and most expensive grade. The meat is well marbled, tender, and flavorful. Marbling in meat is valued because it adds to the flavor of the meat. Choice beef has less marbling than prime but is still tender and flavorful. It is the most common grade sold in supermarkets. Select beef has the least amount of marbling and is the least expensive. It is sometimes sold as a store brand. Figure 34.5 shows what USDA beef stamps look like.

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**Figure 34.4** Meat Label

**Product Information** The label on a meat package shows the animal the meat came from, the cut of the meat, the weight, and the price. **What is the difference between wholesale and retail cuts?**

<table>
<thead>
<tr>
<th>Type of meat</th>
<th>Wholesale cut</th>
<th>Retail cut</th>
<th>Net weight</th>
<th>Cost of package</th>
<th>Unit price</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEEF</td>
<td>TOP ROUND</td>
<td>STEAK</td>
<td>0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

**Figure 34.5** Grades of Beef

**Common Beef Grades** Prime, choice, and select are the most common grades of beef. **Which grade is the most expensive? Why?**

- USDA SELECT
- USDA CHOICE
- USDA PRIME
Meat Tenderness

Some cuts of meat are more tender than others. There are two major reasons for this.

Muscle Movement  The less a muscle moves, the more tender it is. Muscles along the backbone get very little movement, for example, so meat from that area is more tender than meat from other parts of the animal.

Marbling  The amount of marbling affects tenderness. Fat in marbling melts during cooking, releasing juice and flavor. As fat melts, it penetrates the muscle tissue and helps separate muscle fibers making the meat easier to chew.

Bone shapes give clues about where the meat comes from on the animal and how tender it is. Figure 34.6 shows the seven common bone shapes. The rib and T-shape bones, which are part of the backbone, indicate that the meat is tender. The meat on a blade bone, which is part of the shoulder, is not as tender.
Tenderizing Meat

Less tender cuts of meat can be tenderized before cooking by one of several methods. Mechanical methods such as grinding, pounding, and cutting tenderize meat by breaking down elastin. Less tender cuts of beef, for example, can be ground into hamburger or pounded with a meat pounder to make cube steaks.

Chemical methods such as adding acid tenderize meat by softening the collagen and breaking down elastin. Tomatoes, sour cream, yogurt, vinegar, and lemon juice can be used to tenderize meat. The meat can be marinated in the mixture before cooking, or the acid mixture can be added during cooking.

Commercial meat tenderizer can also be sprinkled on meat to increase its tenderness. Meat tenderizer contains salt and three papaya enzymes that break down muscle fibers.

Ground Meat

Ground meat is popular and relatively inexpensive one of its best known uses is in hamburgers. It is also an important ingredient in meat loaf, tacos, sloppy joes, and tomato-based meat sauces.

Less tender cuts of meat, along with trimmings, are often ground. Ground beef, also called hamburger, is the most popular ground meat. About 45 percent of the beef in the United States is made into ground beef.

Ground beef is available with different amounts of fat. By law, ground beef cannot have more than 30 percent fat by weight. It may contain seasonings, but no extenders or binders. Regular ground beef has the most fat, is the least expensive, and shrinks most when cooked. Ground chuck contains 15 to 20 percent fat, which makes for flavorful and juicy hamburgers. Ground round and ground sirloin have the least fat and are the most expensive. Ground meat that is labeled “lean” must have less than 10 grams of total fat, less than 4.5 grams of saturated fat, and less than 95 milligrams of cholesterol per 3½-ounce serving. Lean ground beef usually costs more than regular ground beef.

You can buy ground beef already packaged or have it ground to order. You can also buy ground lamb, pork, and veal. You can ask to have meat ground for you. A combination of equal parts of ground beef, pork, and veal works well for meatloaf.

Packaged ground beef is often red on the outside and slightly bluish on the inside. When meat is exposed to air, oxygen causes it to turn red. The interior of the ground beef does not get enough oxygen to turn red.

Variety Meats

A variety meat is a meat consisting of edible organs and extremities of beef, veal, lamb, or pork. Variety meats include liver, kidney, pigs feet, brains, heart, tongue, oxtails, and sweetbreads (thymus gland). Variety meats are highly perishable, so they must be fresh when purchased and cooked within 24 hours.

Variety meats are used extensively in Europe and other parts of the world. Andouille (ənˈdyü-ə), for instance, is a French sausage made with chitterlings (pig intestines) and tripe (the stomach lining of cattle). The Cajun version is spicy and is usually made from pork shoulder. Andouille is a major ingredient in jambalaya and gumbo. Variety meats are used less in the United States, so most variety meats produced in the U.S. are exported.
Processed Meats

A **processed meat** is a meat with added flavor and preservatives. Processed meats include ham, bacon, sausage, and cold cuts. **Cold cuts** are processed slices of cold meat and poultry.

About 35 percent of the meat produced in the United States is processed. About 75 percent of all processed meat is pork. The remaining 25 percent is beef.

Three methods are used to process meats: curing, smoking, and cooking. Several methods are often used on one product.

**Cured meats** Cured meats can be pickle-cured or dry-cured. Pickle-curing involves soaking the meat in a solution of salt, sugar, sodium nitrate, potassium nitrate, ascorbic acid, and water or pumping the solution into the meat. In dry-curing, no water is used. The mixture is rubbed onto the surface of the meat.

**Smoked Meats** Originally, smoking meat meant exposing it to wood smoke to preserve and flavor it. Today, liquid smoke is used for flavoring.

**Cooked Meats** Cooked, processed meats are ready to eat. Pasteurization increases the shelf life of the meat.

### Convenience Forms of Meat

Convenience forms of meat include canned, frozen, and ready-to-cook products. Convenience products cost much more than the same foods prepared from scratch at home.

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**Careers in Food**

**Ronnie Huettmann**

**Butcher**

**Q:** What does a butcher do?

**A:** A butcher is someone who slaughters and processes meat for retail to the public. Butchers cut up the meat and package it for stores. Meat-cutters cut the meat down into individual portions for customers.

**Q:** How do you become a butcher?

**A:** On-the-job training is common among butchers. Simple cutting operations require a few days to learn, while more complicated tasks require several months of training. Trainees learn the proper use and care of tools and equipment, while also learning how to prepare various cuts of meat. After demonstrating skill with various meat cutting tools, trainees learn to divide carcasses into wholesale cuts and wholesale cuts into retail and individual portions. Trainees also may learn to roll and tie roasts, prepare sausage, and cure meat.

Those employed in retail food establishments often are taught operations, such as inventory control, meat buying, and recordkeeping.

**Q:** What type of person typically is best-suited for the profession?

**A:** People who become butchers usually have a culinary background or an agricultural background.

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**Education and Training**

Most butchers learn their skills through on-the-job training. The training period for highly skilled butchers at the retail level may be one or two years.

**Qualities and Skills**

Knife sharpening skills are very important. Manual dexterity, physical strength, and hand-eye coordination.

**Related Career Opportunities**

There are career opportunities within the companies that process meat. Butchers in food processing businesses and retail stores may progress to supervisory positions. They may also become meat buyers.

---

“It is really important to be the best that you can be at whatever choice you make.”

— Ronnie Huettmann, President, Acre Station Meat Farm – Pinetown, NC
Many canned meat entrées are available, including beef stew and spaghetti and meatballs. Many frozen entrées have meat, along with starches and vegetables. Roast beef, for example, might have side servings of peas and mashed potatoes. Most supermarkets carry ready-to-cook meats, such as ready-made meatloaf that just needs baking.

Identify What two factors influence meat tenderness?

Buying and Storing Meat

Meat can be one of the most expensive items in the food budget. To get the most for your money, you need to shop wisely and store meat properly.

Buying Meat

Buy only the amount of meat that you need. Calculate how much meat you will need for the recipe you have chosen and the number of people you will serve. Add a little extra if you want leftovers.

Choose the cut that looks the leanest. This saves money because you do not have to pay for extra fat that you will discard. Lean beef roasts and steaks include round, loin, sirloin, and chuck arm. Lean pork roasts and chops include tenderloin, center loin, and ham. Lean lamb roasts and chops include the leg, loin, and foreshank. All veal is lean except ground veal. Tender cuts are usually more expensive than tough cuts. You can save money by learning tasty recipes for tough cuts.

Always compare the cost per serving of different cuts. If you find a bargain that is not on your shopping list, you might decide to change plans. Even small savings add up over time.

Storing Meat

Meat must be refrigerated. Place meat in a plastic bag to keep the juices from dripping on other food. Variety meats should be used within one day, and ground meat should be used within two days. Other fresh meats keep in the refrigerator for three to five days. Freeze meat for longer storage.

If you are refrigerating unopened packages of processed meat, refer to the date on the label for length of storage. If the package has been opened, use the meat within a few days. Read label directions for storing canned meats.

Summarize How can you save money when buying meat?

Well-prepared meat is tender, not dry or tough. How can you cook meat to keep it moist and tender?
Cooking Meat

Cooking affects meat in several ways. When properly cooked, meat becomes more firm, fat melts, and connective tissues soften. As a result, the meat becomes tender, juicy, and flavorful.

Protein is sensitive to heat, so you must carefully control cooking temperatures and times. Cooking meat for a long time at high temperatures can cause it to shrink significantly. Overcooked meat is tough and dry and may be difficult to cut and digest.

Heat does not usually destroy nutrients in meat. However, water-soluble vitamins, such as B vitamins, may be lost in the meat juices or cooking liquid. To recapture the vitamins, the meat juices or cooking liquid can be added to soups, sauces, or gravies.

Preparing Meat

The USDA requires that safe handling instructions be on all packages of raw and partially cooked meat. Make sure to read these instructions when you prepare meat. Here are the basic steps in preparing meat:

Thaw. If the meat is frozen, thaw it before cooking to save time and preserve quality. If you want to cook frozen meat without thawing, increase the cooking time by about 50 percent. For example, if the normal cooking time for a cut is 40 minutes, cook a frozen cut for 60 minutes.

Rinse. Before cooking meat, rinse it under cold water and pat it dry with a paper towel.

Trim fat. Trim any visible fat before cooking so drippings are less fatty. Fat is easier to trim when meat is very cold.

Marinate. Before cooking meat, you can marinate it for added flavor and tenderness. To make a marinade, choose at least one acidic ingredient. Vinegar, yogurt, or fruit juice work well. Add a little cooking oil and season the mix with herbs and spices. Pour the marinade over the meat, cover, and refrigerate. Do not marinate for more than 24 hours or the meat will get mushy.

Marinating works best on thin cuts of meat. Acid pits aluminum, so do not use an aluminum pan for marinating. Marinades can pick up contaminants from raw meat, so do not use leftover marinade for basting unless you boil it first for one minute.

Cook. The tenderness of a meat cut determines its cooking method. Tender cuts, such as steaks, chops, and roasts, can be cooked quickly with dry heat methods, such as roasting and broiling. Less tender cuts, such as arm shoulder chops and short ribs, must be cooked for longer periods with moist heat methods, such as braising and stewing. Moist heat breaks down the collagen in the meat, making it tender. Remember high and fast for tender cuts and low and slow for tough cuts.

Testing for Doneness

Doneness is the point at which meat has cooked enough to make it flavorful and safe to eat. If any part of the meat is not cooked until fully done, it may cause foodborne illness.

The Threat of Thawing

There are several ways to thaw frozen meat, but not all are safe. Improper thawing leads to the growth of bacteria and threatens food safety. Never thaw meat at room temperature or in warm water. Instead, thaw meat in the refrigerator, where its temperature can decrease slowly and safely. Keep the meat in its original packaging with a dish or tray underneath it. You can also thaw meat by putting it in a leakproof bag and immersing it in cold water. Change the water every 30 minutes. Or, use your microwave to quickly thaw meat, following the instructions in the product manual.

What Would You Do? In one hour, you plan to prepare steaks for dinner. However, you forgot to move them from the freezer to the refrigerator to thaw out. You need to have the steaks ready soon.
Doneness is hard to judge visually. Using a meat thermometer is the safest method. When you roast cuts more than 2 inches thick, insert the meat thermometer into the thickest part. Be sure that the tip of the thermometer does not touch bone or rest in fat, which gives an incorrect reading. You can use an instant-read thermometer or an oven-safe thermometer.

For thin cuts, check the temperature with an instant-read thermometer near the end of the cooking time. Some instant-read thermometers have a dial, and some have a digital display. You can check the accuracy of your thermometer by placing it in a glass of ice water. It should register 37°F.

Meat can be cooked to these basic stages of doneness: medium rare, medium, and well done. Each stage is indicated by a specific internal temperature. Figure 34.7 shows internal doneness temperatures for various types of meat.

Cooking time depends on the cooking method and the cut of the meat. The cooking time in the recipe is just a guide. Begin testing the meat for doneness about 10 minutes before the end of the expected cooking time.

**Broiling Meat**

Broiled meat is cooked very close to the heating element. Because it uses high heat, broiled food has an appetizing brown exterior.

Tender cuts of meat such as steaks, chops, ham slices, liver, bacon, and ground beef can be broiled. Steaks and chops should be at least ½ inch thick. Thinner pieces dry out if broiled.

When fat cooks, it melts and shrinks, pulling up the meat. Make slashes through any fat left on the edges of meat before broiling to help keep the meat from curling. You can also add flavor by brushing a sauce on the meat.

Place the broiler pan so the meat is 2 to 5 inches from the heat. Thicker cuts need more time to heat, so they should be placed farther from the heat. Broil until the top is brown and the meat is slightly more than half done inside. Season if desired. Turn and complete the broiling on the other side.

**Grilling Meat**

Tender cuts of meat can be grilled. You can grill whole cuts or make kebabs. To make kebabs, thread cubes of meat onto skewers, alternating with tomato quarters, mushrooms, green pepper chunks, or other vegetables. Brush with oil, melted butter, or a sauce to keep the foods from drying out.

Heat the grill. Place the meat or kebabs on the grate and turn them regularly to cook through. Brush the meat occasionally with a sauce. Sauces that contain a large amount of sugar, such as barbecue sauce, can cause meat to char. If you want to use a sweet sauce, wait until the last few minutes of cooking to begin basting.

**Roasting Meat**

Roasting works best with large tender cuts of meat, such as loin, rib, and leg roasts. Follow these steps to roast meat:
1. **Place in a pan.** Place the meat fat side up on a rack in an open, shallow roasting pan. As the fat melts, it automatically bastes the meat. The rack should hold the roast out of the drippings. For standing rib roasts or crown of pork, the ribs form a natural rack, so the meat can be placed directly on the pan bottom.

2. **Season.** Season the meat as desired.

3. **Insert the thermometer.** Insert an oven-safe meat thermometer so the tip is centered in the largest muscle.

4. **Roast.** Roast at 325°F without preheating the oven. If you wish, add whole small potatoes, onions, and carrots around the roast about an hour before it’s done. Do not add water or cover the pan. This causes the meat to cook with moisture rather than dry heat.

5. **Test for doneness.** Remove the roast from the oven when the meat thermometer registers five degrees lower than the desired internal temperature. The meat continues to cook as it stands.

6. **Let stand.** Let the roast stand for 15 to 20 minutes after removing it from the oven. This allows the juices to set and makes the roast easier to carve.

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**Frying Meat**

Thin pieces of tender meat can be fried in a small amount of fat. Lean cuts of meat or cuts that are floured or breaded need more fat.

Cook meat uncovered in a skillet preheated to medium. Turn occasionally so both sides brown. Do not cover the skillet or the meat will cook in moist heat and lose crispness and flavor. Season the meat after browning.

**Pan-Broiling Meat**

Pan-broil tender cuts of meat that are too thin to broil. Use cuts that are 1 inch thick or less. Preheat a heavy skillet. Most cuts have enough fat to prevent sticking without adding oil. If you are using a lean cut, use a nonstick skillet or brush or spray the regular skillet with oil. Use medium heat and do not cover the skillet. Turn the meat occasionally and pour off fat as it accumulates. Cook until brown on both sides, and then season if desired.

**Braising Meat**

Braising is used to cook large, less tender cuts of meat, such as pot roast and Swiss steak. It also gives flavor to tender cuts.

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**Judging Doneness**

Use an instant-read thermometer, shown on the left, to test thin cuts of meat like hamburger. Use an instant-read thermometer or an oven-safe thermometer, shown on the right, or for thicker cuts. *Why is it important to use a thermometer to test doneness?*
Brown the meat on all sides in a large heavy pan, using a little fat if needed to prevent sticking. After browning, drain off excess fat. Add just enough liquid, such as water, tomato juice, meat stock, or another seasoned liquid, to cover the bottom of the pan about \( \frac{1}{4} \) inch deep. The liquid must flow under the food to keep it from sticking to the pan. Add seasonings and cover the pan with a tight-fitting lid.

Simmer on low heat until the meat is tender, or cook in the oven at 325°F. About halfway through the cooking time, you can add carrots, potatoes, and onions.

**Pressure-Cooking Meat**

Large, less tender cuts of meat can be pressure cooked. This cooks the meat in moist heat and tenderizes it under high pressure within a relatively short time.

**Slow-Cooking Meat**

A slow cooker uses a low temperature for a long cooking time, which makes it ideal for less tender cuts of meat. A slow cooker allows you to prepare a meal in the morning and have it ready for dinner when you come home from work or school.

**Microwaving Meat**

Cuts of uniform size are the best choice for microwave cooking. Microwave ovens do not cook evenly, even if they have a turntable. During the standing time, cover the meat loosely with foil to hold in the heat. After the standing time, check the meat in several spots with an instant-read thermometer to be sure it has reached the proper internal temperature throughout.

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**Recipe: Pot Roast**

**Ingredients**

- 2 lbs. Boneless chuck roast
- 1 cup Tomato juice
- 1 cup Reduced fat, low-sodium beef broth
- 2 Tbsp. Olive Oil
- 2 Tbsp. Prepared mustard
- 2 tsp. Worcestershire sauce
- 1 tsp. Fresh or dried rosemary

**Directions**

1. In a large plastic, sealable bag, combine the tomato juice, stock, rosemary, olive oil, mustard, and Worcestershire sauce. Place the meat in the bag and seal the bag.
2. Place the bag in refrigerator and let sit overnight. After a few hours, turn the bag over at least once.
3. Preheat oven to 350°F.
4. Remove the meat from the refrigerator and place it in a roasting pan. Place the meat in the oven and roast for at least two hours. Use an instant-read thermometer and remove the roast when it reaches 160°F.
5. Slice the meat against the grain and serve with roasted vegetables.

**Nutrition Analysis per Serving**

- Calories: 260
- Total fat: 17 g
- Saturated fat: 6 g
- Cholesterol: 72 mg
- Sodium: 198 mg
- Carbohydrate: 2 g
- Dietary fiber: 0 g
- Sugars: 2 g
- Protein: 23 g

*Though a roast is usually made from a tough piece of meat, that meat is often low in fat. Tenderizing it with a marinade and slowly roasting it creates a savory meal.*
Chapter Summary
Meat is made up of muscle, connective tissue, and fat. It provides many nutrients. There are several types and cuts of meat. Meat is inspected for wholesomeness and graded for quality. Some cuts of meat are more tender than others. In addition to meat cuts, there are ground meats, variety meats, processed meats, and convenience forms of meat. Meat should be bought carefully and stored properly. Cooking affects meat in several ways. There are basic steps to prepare meat for cooking. For safety reasons, it is important to check meat for doneness. Meat can be cooked using a variety of methods.

Content and Academic Vocabulary Review
1. Write a sentence using two or more of these content and academic vocabulary words. The sentence should clearly show how the terms are related.

**Content Vocabulary**
- meat (p. 534)
- muscle (p. 534)
- grain (p. 534)
- connective tissue (p. 534)
- collagen (p. 534)
- elastin (p. 534)
- marbling (p. 534)
- cut (p. 534)
- wholesale cut (p. 534)

**Academic Vocabulary**
- retail cut (p. 536)
- variety meat (p. 538)
- processed meat (p. 539)
- cold cuts (p. 539)
- doneness (p. 541)
- similar (p. 536)
- uniform (p. 536)

Review Key Concepts
2. Explain the three main parts of meat.
3. Describe the nutritional value of meat.
4. Identify and explain the most common grades of beef.
5. Explain what to look for when buying meat.

Critical Thinking
7. Explain why a meat label can not be accurate if it says fat-free.
8. Infer why some meat producers keep animals in small confines to prevent too much movement.
9. Compare and contrast inspection and grading of meat.
10. Identify which tool is absolutely necessary to safely cook meat. Explain why.
11. Meatball Comparison

Meatballs are an easy-to-prepare addition to many dishes. In their convenience form, they require virtually no preparation. Do you prefer homemade or pre-made meatballs?

Procedure
Choose a recipe for meatballs and prepare it. Also prepare ready-made meatballs purchased as a convenience food. Follow package directions. Conduct a taste test to sample and compare both products.

Analysis
As a team, create a table that compares the taste, texture, appearance, nutrition, and approximate cost per serving of the two forms of meatballs. Share your chart with the class. Explain which form you would choose in the future and why?

12. Watching the Fat
To maintain a healthy diet, Angela is watching her fat intake. She wants to prepare healthy, low-fat hamburgers topped with roasted vegetables and sandwiched between whole-grain buns. Angela wants to use meat with the lowest amount of fat possible. Should she use ground beef, ground chuck, ground sirloin, or lean ground beef to make her healthy hamburgers?

13. Nutrition Comparison
Compare the protein and fat amounts in four different cuts of beef, such as round, sirloin, rib, and flank. Use spreadsheet or word processing software to create a graph or chart that shows your findings. Then write one or more paragraphs to answer these questions: Which cut provides the least amount of fat? Which cooking method would you choose to use for each of the four different cuts? Explain your answers.

14. Managing Meat Juices
Ben, a nutritionist, cooked a lamb roast. He noticed that a lot of meat juices filled the bottom of the roasting pan. Why do you think he viewed this as a problem, and how might he have solved it?

15. Meat Cut Display
Follow your teacher’s instructions to form pairs. Find an image of the cut of meat your teacher assigns to you. Using the image as a reference, work together to draw an oversized version of the meat cut on a piece of posterboard. Add color and cut it out.

16. Cost Per Serving
Fiona eats two 3-ounce servings of meat per day. She is on a food budget and wants to save money. Each canned meat entrée contains 3 ounces of meat and cost $3.89. Lean lamb chops cost $5.70 per pound. Which choice has the lower cost per 3-ounce serving? By how much is the cost lower?
Academic Skills

Food Science

17. Browning of Meat Caramelization is the browning of surface sugars on foods such as meat. How can we use this information in cooking meat?

Procedure Cut beef steak into 9 strips ½” wide and 4” in length. Divide into 3 groups. Dissolve 2 teaspoons of corn syrup in ½ cup of warm water. Put the first group in this syrup, and marinade for at least an hour or longer. Pat dry. Dip the next group of strips into flour to coat well, shaking off excess. Heat a small amount of vegetable oil in three small skillets, and sauté each group about 5 minutes, turning to brown well on all sides. Use a table to show the results.

Analysis Write a paragraph to describe any differences in browning.

Starting Hint The pounded veal is $(\frac{1}{8})/\left(\frac{2}{3}\right)$ of the original thickness. Since it is improper to have fractions within a fraction, simplify the fraction by dividing $\frac{1}{8}$ by $\frac{2}{3}$ (which is the same as multiplying $\frac{1}{8}$ by $\frac{3}{2}$). Convert to a percent.

English Language Arts

19. Meat: To Eat or Not to Eat? Vegetarians and meat eaters feel strongly about diets that eliminate or include meat. What is your view? Write a two-minute speech in which you explain why you do or do not eat meat.

Mathematics

18. Tenderizing Veal Antonia has purchased several veal cutlets, which she would like to bread and fry for use in a veal parmigiana dish. Each cutlet is ⅞ inch thick when purchased. However, she will need to tenderize the cutlets and reduce their thickness so that they will cook more evenly when frying. Antonia pounds each cutlet to a thickness of $\frac{1}{4}$ 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.

READING COMPREHENSION

Re-read the section about storing meat on page 540. Then select the best answer.

20. How soon after buying should ground meat be used?
   a. within one day
   b. within two days
   c. within three to five days
   d. within three days of the sell-by date

Test-Taking Tip Closely read the text to which the question refers. Then read through the question and each of the answer choices. Some answers may seem correct, but they contain subtle errors. Pay attention to every word.