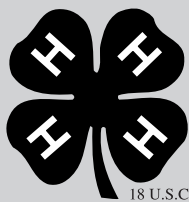


Maryland Various Meat



18 U.S.C. 707

An Introduction to Meat,
Meat Processing, and
Meat Judging



VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

Virginia Cooperative Extension

Knowledge for the Commonwealth



VIRGINIA STATE UNIVERSITY

4-H Meat Project Helper's Guide

Congratulations! You have been asked to be a 4-H Meat Project Helper by a young person interested in understanding meat. The Marvelous Meat curriculum helps young people explore meat usage, meat's value as food, how meat is produced, the meat industry, and meat judging. Youth will learn everything from how to read meat product labels to how meat is processed and cooked. Interesting hands-on projects help explain the importance of meat to human health and well-being.

It is your job to guide the young person through the experiences outlined in this activity guide. The young person will develop a working knowledge of meat identification, selection, and preparation. Your responsibility will be to provide the encouragement and recognition needed for decision making, problem solving, creative thinking, and communication.

The 4-H Meat Project

This activity guide centers on meat identification, learning to be an informed meat consumer, and meat judging. The guide has been written for youth ages 11 to 14 (grades 6 through 8). However, it may be used by youth at any grade-level based on their knowledge of meat and meat production. The activities in this book will strengthen their understanding of meat products and production and provide an introduction to meat judging.

Project Helper's Role

To gain the most from this learning experience:

- Review the Marvelous Meat Activity Guide.
- Support the youth as he or she sets goals and completes each activity.
- Play a proactive role in helping select activities, assisting in activity completion, and answering questions.
- Help youth think about what they are experiencing and learning through active listening and open-ended questioning.
- Serve as a resource person to help connect the young person with the community, resource materials, and others knowledgeable about meat.
- The activities in this book were developed using the 4-H Experiential Learning Model.

4-H Meat Project Goals

The goals of this project series are:

- To stimulate an interest in meat, meat in nutrition, meat preparation, and meat judging
- To provide meat identification and selection education
- To improve nutrition education for responsible living and good health
- To help the youth understand the process of meat production and responsible decision making when selecting and using meat
- To teach proper preparation and how to serve meat products for tasty meals
- To help the youth understand life cycles and the food cycle
- To provide hands-on learning experiences for a better understanding of meat and meat judging

Evaluating the Experience

At the introduction of each activity there is an *Achievement Check* assessment. You can evaluate the learning experience by assessing your youth's successful accomplishment of this indicator. Also, ask the questions under *Investigating Meat* found in each activity to evaluate your youth's understanding of the key concepts and life skills practiced in each activity.

Please see the back cover for more information on the Experiential Learning Model.

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Dury, J. 1966. Chicago, Ill.: *Rare and Well Done: Some
Historical Notes on Meats and Meatmen*. Quadrangle
Books, Inc.

Harrell, M., and Harrell, R. 1977. *The Ham Book: A
Comprehensive Guide to Ham Cookery*. Norfolk, Va.:
Donning Company Publishers.

National Livestock and Meat Board, Beef Promotion
and Research Board, National Pork Board. 1991. *The
Meat Board's Lessons on Meat*.

Virginia Cooperative Extension, publication 388-743.
1984. Blacksburg, Va.: *4-H Meats Project*

WARNING: Some web sites to which these materials provide
links for the convenience of users are not managed by Virginia
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Marvelous Meat




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Marvelous Meat

Activity Guide

Each activity in this 4-H Meat Project is designed to help you learn something new about meat or meat judging. Here is a look at the various sections found in each activity.

Skills

Each activity lists 4-H life skills and science process skills that are practiced as you do the activity. You will also have many opportunities to share what you learned with others.

Educational Standards

Each activity lists the Virginia Standards of Learning (Virginia SOLs) for sixth and seventh grade life sciences and health, and the National Science Standards (for fifth through eighth grade) that are addressed by the activity.

Achievement Check

The skill that you should learn by completing this activity. Keep working on the activity until you have mastered the skill.

Materials

Materials needed to do each activity.

Explore and Discover

The part of the activity where you participate in learning about meat.

The following are found in each activity:

Meat Information

Information on meat and meat judging that will help you understand and complete each activity.



Safety

Helpful tips on the safe handling of meat and meat products.



More About Meat

Extra activities which will expand upon what you have learned.



Meat in History

Interesting facts on the history of meat and meat processing.



Investigating Meat

Questions related to what you have learned about meat and meat judging for your discussion.



Glossary

New words for you to use. They are found in bold print in the activities. Definitions are found in the glossary beginning on page 35.



Considering Meat

Additional activities that will help you use and understand what you learned in the activity.



Meat Connections

Web sites and Virginia Cooperative Extension fact sheets that can help you learn more about meat and meat judging.



Marvelous Meat

Achievement Program

To complete the Marvelous Meat Project, you must:

- Select a 4-H Meat Project Helper
- Complete a minimum of five activities in the Marvelous Meat Activity Guide
- Participate in a minimum of two leadership and service learning experiences

4-H Meat Project Helper

Your 4-H Meat Project Helper may be anyone who has the interest to work with you on these activities. This could be your project leader, teacher, neighbor, friend, or family member. Ask your helper to assist you throughout this project. He or she can help you set your project goals, discuss activity questions, and locate resources.

4-H Project Meat Helper

Name _____ Phone _____ Email _____

4-H Meat Project Activities

Carry out at least three Required Activities (Explore and Discover) and two Optional Activities (More About Meat or Considering Meat). Ask your helper to date and initial this log as you complete the activities.

Required Activity

(Explore and Discover)

	Date Completed	Helper's Initials	Required Activity (Explore and Discover)	Date Completed	Helper's Initials
We Love to Eat!	_____	_____	Hog Heaven	_____	_____
Nutritious Meat	_____	_____	Learning About Lamb	_____	_____
Where It All Begins	_____	_____	Selecting and Cooking Meat	_____	_____
Meat at the Market	_____	_____	More to Meat than Meets the Eye	_____	_____
Bits about Beef	_____	_____	Introduction to Meat Judging	_____	_____

Optional Activities

(More about Meat or Considering Meat)

	Date Completed	Helper's Initials
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Leadership and Service Learning Experiences

Select and participate in at least two of these leadership and service learning experiences, or devise some of your own. A leadership activity requires the organization of and the participation in an event, presentation, or tour.

Leadership Experience	Date Completed	Helper's Initials
Give a meat judging demonstration	_____	_____
Teach someone something about meat/meat judging	_____	_____
Plan a meat cutting demonstration for your club	_____	_____
Give a speech on a meat subject	_____	_____
Plan a butcher shop tour for your club	_____	_____
Exhibit a meat project	_____	_____
My own activity: _____	_____	_____
_____	_____	_____

We Love to Eat!

With all of the interesting things going on at home and at school, why would you want to learn more about meat? The answer to that question is quite simple. People require food to sustain their lives. We eat food to satisfy our hunger and to meet our basic need for nutrients and energy. Food provides the elements and energy necessary for healthy growth and living.

Meat, a good source of the nutrients we need, is an important part of most American diets. People enjoy eating meat, and much of the enjoyment of mealtime comes from having tasty meat dishes on the table. Learning about meat, such as where it comes from, how it is processed for purchase, and how to select meats for different occasions, will make you a better **consumer** of meat. Understanding meat will help you prepare healthier and tastier meals.

Explore and Discover

What is meat? Meat is the muscle and organ tissue of certain animals that we use as food. What types of meat do you eat? Over the course of a week, you may eat many different types of meat from many different types of animals.

In this activity you will investigate the different types of meat you like to eat. You might be surprised by the number of times that you eat meat during a single day. A typical daily diet might include bacon for breakfast, a ham sandwich for lunch, and a hamburger for dinner. Do you think that you might eat meat three times a day? Two times a day? Let's find out!

List the meat foods that you eat over the next three days. Don't forget the pepperoni on your pizza or the bacon bits in your salad!

Activity: Understanding why people eat meat

Life Skill: Learning to learn - Interprets and applies new knowledge

Science Process Skill: Gathering and analyzing data

Achievement Check: You can describe why people eat meat

Virginia SOL: Science 6.1, Life Science 14

National Science Standard: Scientific investigations sometimes result in new ideas and phenomena for study

Materials: Pencil

1

	Day 1	Day 2	Day 3
Breakfast	_____	_____	_____
Lunch	_____	_____	_____
Dinner	_____	_____	_____

Share with your helper or your group the different types of meat you ate each day. Were there some days that you did not eat meat? How many times a day did you eat a type of meat? Were you surprised by how much meat you ate over the course of three days?



Many of the meats that we eat come from **cattle, swine, and sheep**. Use a dictionary, encyclopedia, VCE Fact Sheet: Major Sources of Meat, or other resources to learn about the following types of meat. Fill in the blank with the name of the animal from which it comes.

Meat type	Animal
Mutton	_____
Pork	_____
Veal	_____

Meat type	Animal
Beef	_____
Lamb	_____

Answers: Mutton from sheep; Pork from swine; Veal from young cow; Lamb from young sheep; Beef from cattle



Let's Talk

What animals provide the meats you enjoy eating?

What other animals are used for food by people other than cattle, swine, and sheep? Do you ever eat meats from any of these other animals?



Share your list with your group. Discuss how these sayings became part of our everyday speech.

Beef	Consumer	Ham	Lamb	Sheep
Mutton	Pork	Swine	Veal	Cattle

Let's Reflect

Why would learning about meat and meat production improve your ability to purchase a quality piece of meat?

Describe what your daily meals would be like if meat were not available.

Let's Use It

Since meat comes from animals, how does learning about meat make you a more responsible consumer?

What are some ways to improve your decision-making skills as a consumer?



Make a list of words, idioms, or phrases that we use in our daily conversations that relate to meat such as:

I'm in hog heaven. What's your beef? Hogwash!

Hot diggity dog! Bring home the bacon.



The birthplace of today's hamburger was Russia! In medieval times the Tartar people of the Baltic states would chop up beef, mix it with onion juice, salt, and pepper, and eat it raw. This chopped meat concoction was considered a great delicacy. German traders carried this recipe to Hamburg, Germany, which gave it its name. Hamburgers were not served as a sandwich until the 1904 St. Louis Fair when an unknown chef found it was easier to serve fair-goers their grilled hamburger steak between two slices of bread. (from *Rare and Well Done*, by John Drury)



Meat in Times of Yore

One of the goals of the second voyage of Christopher Columbus was to start a permanent Spanish colony in the New World. In 1493, Columbus brought a crew of 1200 sailors, soldiers, and settlers to what is now Cuba. In the holds of the ships were farm tools; seeds and cuttings for the planting of wheat, oranges, grapes, sugarcane, and melons; and crates of chickens, goats, sheep, pigs, cattle, and horses.

Cattle and Beef

Cattle had not been known in the Americas until their arrival in the hold of Columbus' ship. Once settled in the islands of the West Indies, the warm climate and plentiful food allowed these animals to multiply rapidly. The cattle spread with the Spanish as they explored the New World. In Texas, cattle became acclimated to the hot, dry weather and learned to forage on the grasses of the Great Plains. These cattle evolved into the Texas longhorns that are central to the stories of the cattle drives, cowboys, and rodeos in the Old American West. The development of the trans-continental railroad system shortened the cattle drives and made beef available to more people in distant cities. Shipping cattle from the western plains to the cities supported the growth of the beef industry in America.

Pigs and Pork

Although written history reads that pigs were raised for food in China in 4900 BC, and raised for meat in Europe as early as 1500 BC, it wasn't until Queen Isabelle of Spain advised Columbus to take eight pigs on his second voyage that pigs were known in the Americas. Later, in 1539, Hernando de Soto's expedition brought pigs to what is now the United States. As de Soto's troops traveled and explored the new land, the pigs reproduced rapidly. Their offspring probably populated the mountains of present day Virginia, Georgia, and the Carolinas. Due to this unexpected outcome of his exploration, de Soto is often called the "Father of the American Pork Industry"!

The settlers at Jamestown brought pigs with them in 1607. By 1639, hams were being exported to Europe as a Virginia product along with tobacco, cotton, and indigo. Since raising these three crops was time consuming, the settlers allowed the pigs to wander the woods until winter approached. They would then round up the pigs, fatten them on grain or acorns for a short time, and process them into hams for export.

Sheep and Lamb

Columbus also brought the first sheep to the New World. Sheep were not only important as a food source, but also for the wool they provided. In 1565, a Spanish expedition brought sheep to St. Augustine, Florida from breeding centers that had been established in the Caribbean Islands and Mexico.

By the mid-1700s the wool industry was flourishing in the New England states. Prior to the Revolutionary War, the British restricted many of the exports from the colonies including the export of wool clothing. The colonists reacted by imposing laws that forbade using sheep for food. The result was a thriving wool industry for the growing colonies.

Nutritious Meat

If you asked five people to explain why they eat meat, you might get five different answers. There are many reasons why people eat meat. People often eat meat just because they enjoy the taste or they have health concerns. Peer pressure or family traditions are also reasons for people to eat meat. In some cultures, people eat very little meat, whereas in others they eat meat with every meal.

However, the most important reason for people to eat meat is that it is a very nutritious food. Meat is a good source of high-quality protein that the body uses to build healthy muscles, tissues, and organs. Meat also contains important nutrients, such as iron, niacin, thiamin, and riboflavin, which contribute to good health.

Explore and Discover

People need food to provide the nutrients that build and repair the body, regulate body processes, and furnish energy for living. The Food Guide Pyramid shows the different foods, and the amounts of each, needed for healthy nutrition. Look at the Food Guide Pyramid and find the Meat, Poultry, Fish, Dry Beans, Eggs and Nuts Group and the Milk, Yogurt, and Cheese Group. The foods found in these two groups are excellent sources of high-quality protein, and most of these foods come from animals.

Activity: Understanding how meat is part of a healthy diet

Life Skill: Learning to learn - Interprets diagrams and applies new knowledge

Science Process Skill: Organizing and applying information

Achievement Check: You can explain how meat is part of a healthy diet

Virginia SOLs: Science 6.9, Health 6.2, 7.8
Life Science 4, 6, 7, 9

National Science Standard: Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules

Materials: Pencil, resources on meat



Food Group

Fats and Sweets

Suggested Daily Servings

very little

Milk, Cheese, and Yogurt

2 to 3 servings

Meat, Poultry, Fish,
and Alternates

2 to 3 servings

Fruits

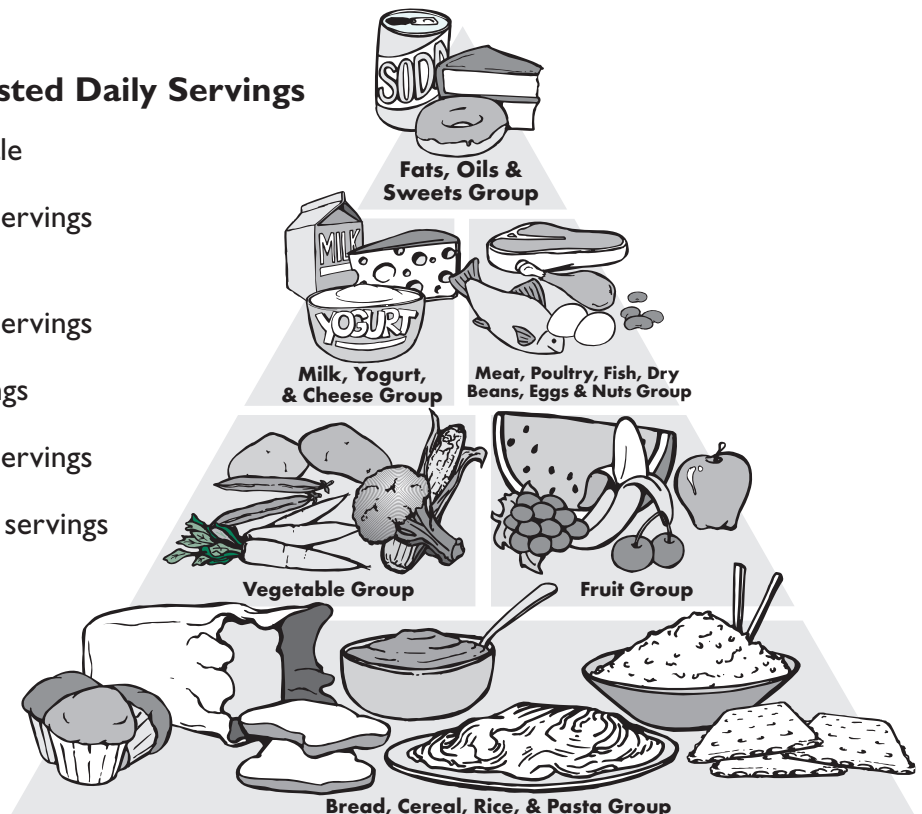
4 servings

Vegetables

3 to 5 servings

Breads, Cereal, and
Other Grain Products

6 to 11 servings



Plan your meals for one day based on the recommended daily requirements of the Food Guide Pyramid:

Breakfast	Lunch	Dinner
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Was it hard to meet all of the suggested daily servings using the foods you like to eat?
Do you usually eat the suggested number of daily servings every day?
How could you change your diet so that you would eat your meals based on the recommended daily requirements of the Food Guide Pyramid?



All living things need to make or ingest a source of energy for good health and growth. Plants make their own food through the process of photosynthesis. During photosynthesis, a plant captures the energy from light to combine water and carbon dioxide into a carbohydrate. **Carbohydrates** are then used for the growth and everyday energy needs of the plant. Animals, however, cannot produce their own food energy and must consume other animals or plants from which they obtain energy and other nutrients.

Animals are divided into three groups based on the types of foods that they eat:

- **Herbivores** are living creatures that eat plants for their food energy needs. Cows, horses, pandas, koala bears, and deer are herbivores.
- **Carnivores** are living creatures that eat only other animals for their food energy needs. Wolves, lions, tigers, and sharks are carnivores.
- **Omnivores** are living creatures that eat both plants and other animals. Bears, raccoons, and humans are omnivores.

Using the Internet or other resources, note the group classification for each of the following animals. Are they herbivores, carnivores, or omnivores? Add to the list some other animals you find that fit into these categories. Share what you learn with your helper.

Animal	herbivore, carnivore, or omnivore?
Pig	_____
Chicken	_____
Elephant	_____
Camel	_____
Shark	_____
Polar bear	_____
Blue whale	_____
Rabbit	_____
Ant	_____
Other:	_____



Let's Talk

Why do you need to know what composes a healthy diet?

How does the Food Guide Pyramid help in planning meals for a day?

Let's Reflect

Do you think that you would be healthy if you ate only foods from one or two of the food groups in the Food Guide Pyramid? Why or why not?

What other foods containing proteins can replace meat in a diet?

Let's Use It

If complete proteins are so important to good health, how do vegetarians live a healthy life without eating meat (animal) proteins?

What other "guidelines," such as those provided by the Food Guide Pyramid, do you use to help you make decisions?



Ancient Egyptian hieroglyphics describe how **balances** were used to measure weight as far back as 4000 BC. Kings, provincial governors, and priests used balance scales to measure small amounts of gold and silver. During the reign of King Amenhotep III (1412-1376 BC) of Egypt, balances began to be used for commercial purposes, and continued to be the primary way that weight was measured throughout most of human history.

It wasn't until the summer of 1830 that a Vermont foundryman named Thaddeus Fairbanks developed a new weighing machine called the "platform scale." Fairbanks realized that he needed a more accurate and efficient way to weigh the wagonloads of hemp that came to his mill. These wagons were weighed by a cumbersome method that required lifting the loaded wagon with chains and a winch and weighing it in a large, primitive balance. Fairbank's platform scale was the prototype of the most familiar object in every butcher shop and supermarket delicatessen in America, the computer weighing scale. (from *Rare and Well Done*, by John Drury)



Nutrition in Meat

Protein

All life requires protein. Protein is the basic substance of every living cell, whether the cell is found in human skin or blood, plant stems or leaves, or animal organs or muscle. Proteins are important to life functions such as the process of growth, regulation of the body's acidity, the production of hormones and **enzymes**, and the functioning of the immune system.

When food is eaten, the proteins in the food are broken down into smaller units called **amino acids**. These amino acids are then used to form many of the parts of living cells. About 20 different amino acids are needed by humans for healthy growth. Of these 20, there are nine that people cannot make for themselves and must be obtained through food.

Animal proteins, called **complete proteins**, provide all of the nine amino acids needed for human growth. The proteins found in plants are called **incomplete proteins**. To provide these nine essential amino acids using incomplete proteins, mixes of complementary plant proteins must be eaten together to make a "complete protein." For example, eating rice and beans together provides the complete set of nine amino acids.

Fats

Fats are an important part of a balanced diet because they add flavor, appetite appeal, and **satiety** value to foods. Fats are an excellent source of energy, providing nine calories per gram. Carbohydrates and protein provide only four calories per gram.

In addition, fats aid in the absorption of the fat-soluble vitamins A, D, E, and K.

Fats are also important because they contain **cholesterol**, which is a fat-like substance that is important to the synthesis of bile acids, some hormones, and cell membranes found in the brain and the nervous system. Dietary cholesterol is found only in animal tissues.

Vitamins and Minerals

Meat is a source of many vitamins and minerals that are necessary for healthy living and growth. These nutrients include iron, phosphorus, zinc, and most of the B-vitamin complex (thiamin, riboflavin, niacin, B⁶, and B¹²). Each of these nutrients has specific functions, which include:

- growth and repair of tissues
- production of enzymes associated with **metabolism**
- releasing energy from carbohydrates, proteins, and fats
- forming bones and teeth
- helping the heart, nerves, and muscles to function properly
- helping maintain good vision and healthy skin and tongue
- aiding digestion
- helping the nervous system function



1. Using what you have learned about carnivores, herbivores, and omnivores, (see diagram below) describe where these animals are found in the **food chain**. Where do you find the animals that eat only plants? As you move up the food chain, what type of animals do you find? Where in the food chain do you find people? Explain your conclusions to your helper.

2. Eat several types of meat. Compare and contrast the characteristics of each. Which type of meat did you enjoy the most? Why do you think it tasted better than the others? Do you think that another person who tasted these same meats might have a different opinion? Why?



A Consumer Guide to Safe Handling and Preparation of Ground Meat and Ground Poultry; VCE publication 458-016

The Food Guide Pyramid and Dietary Guidelines; VCE publication 348-710

Eating the Food Guide Pyramid Way; VCE publication 348-921

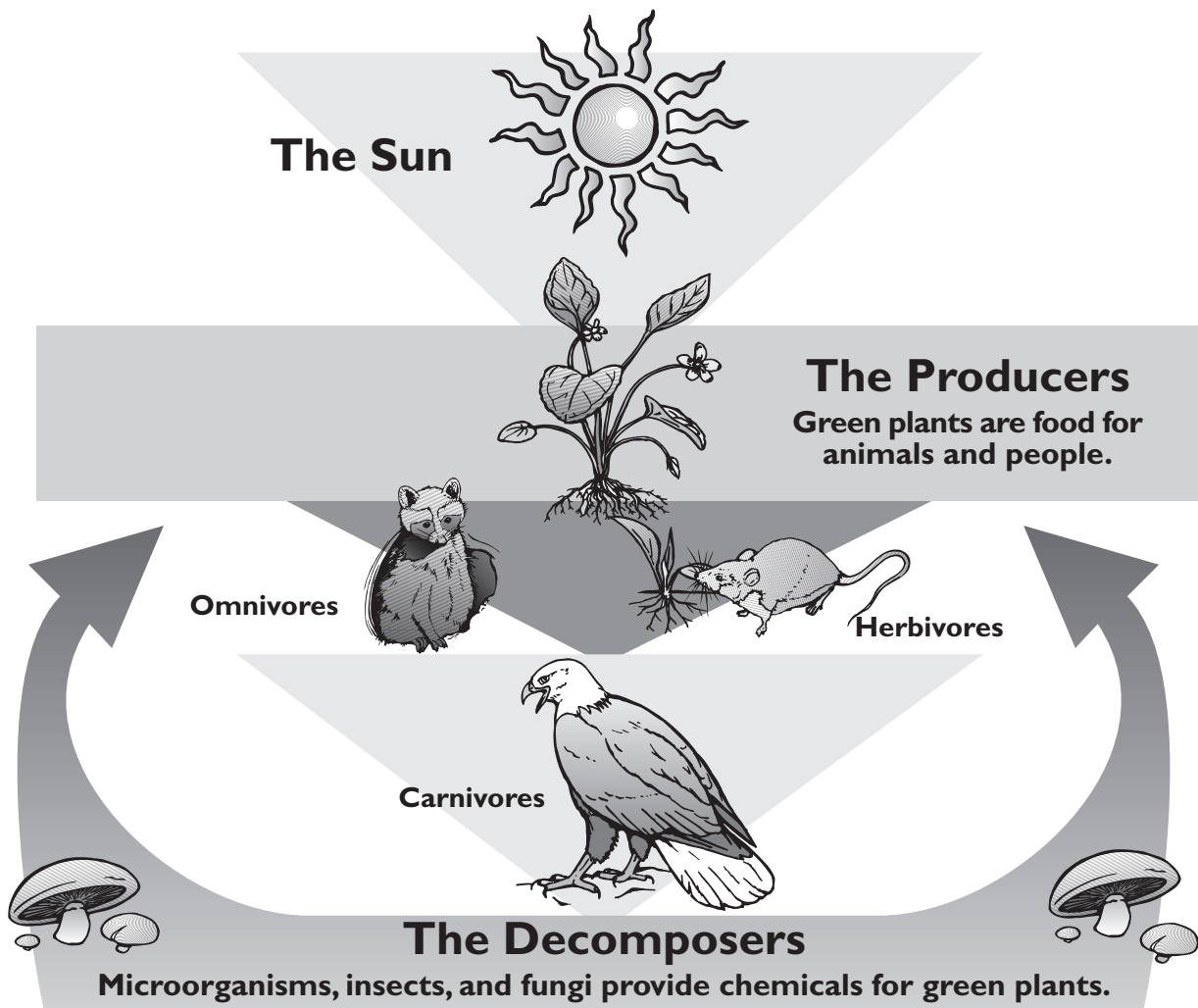
The Milk and Meat Groups; VCE publication 348-927

Virginia 4-H Fit for Life Series, VCE Publications 348-921 to 348-933

Wash Hands: Fight Disease-Causing Germs, VCE Publication 348-965



- | | |
|--------------|--------------------|
| Amino Acids | Balance |
| Carbohydrate | Carnivore |
| Cholesterol | Complete protein |
| Enzyme | Food Chain |
| Herbivore | Incomplete protein |
| Metabolism | Omnivore |
| Satiety | |



Where it All Begins

As you have discovered, different meats come from different animals. Most animals used for meat have been raised for the sole purpose of supplying meat to the **consumer**. The production, transportation, processing, and selling of meat is a big business that requires the services of a variety of people, businesses, and equipment. The entire food production industry is called **agribusiness**. It is important to understand how meat finds its way from the farm to the kitchen and restaurant, and how consumers make informed decisions about meat.

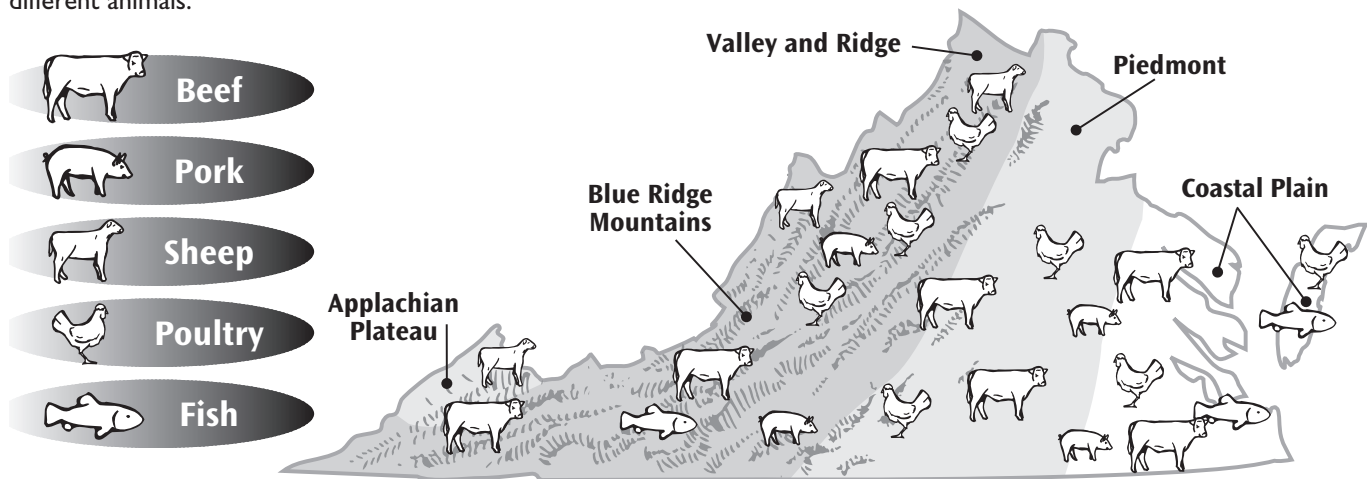
Explore and Discover

Much of America's meat comes from three groups of animals: cattle, swine, and sheep. These animals are raised on farms or in **feedlots** for the sole purpose of providing high-quality meat proteins to you, the consumer. Young animals are raised to a certain age and weight and then sent for processing into cuts of meat that are sold to your local supermarket, or served at your favorite restaurant.

Where Does It Come From?

Using this map of Virginia, locate the areas of the commonwealth where different types of meat are produced.

Discuss with your helper how the different regions of Virginia and their respective climates might provide the necessary environment (weather, seasons, forage, plants) needed for raising these different animals.



Where in Virginia are most of the beef cattle raised? _____

Where in Virginia are most of the swine raised? _____

Where in Virginia are most of the sheep raised? _____

What other animals are raised in Virginia for meat? _____

Why are livestock raised for meat production considered a renewable resource? _____

Activity: Learning about meat production

Life Skill: Learning to learn

Science Process Skill: Observing and recognizing patterns

Achievement Check: You can describe the many components of meat production

Virginia SOLs: Science 6.9, Life Science 12

National Science Standard: Human populations use resources in the environment in order to maintain and improve their existence. Natural resources have been and will continue to be used to maintain human populations

Materials: Pencil

3

AGRICULTIVITY



Let's Talk

Many people and resources are needed to support the meat business. How does each add to the cost of meat?

How would unpredictable weather that kills grasses, such as a summer drought or an extra hard winter, affect the cost of meat?

Let's Reflect

Using what you know about agribusiness, explain why meat is one of the most expensive products at the supermarket.

Why is food produced from animals more expensive than food produced from plants?

Let's Use It

How do transportation, fuel costs, labor, processing, and advertising add to the cost of every product you buy?

What are some ways that you can reduce your food costs and stay within a food budget?



1. Visit a cattle, swine, or sheep farm with your helper. Share what you saw and learned with your group.

2. Prepare a nutritious meal that includes meat but also stays within your food budget.

3. Using library resources or the Internet, find out where meat animals were originally domesticated. Which civilizations were most active in animal domestication?

4. If we spent \$800 to raise a steer that weighed 1,200 pounds, what would be the price per pound of meat from that steer if he produced 600 pounds of beef?

5. Find out how meat farmers work to protect the environment by minimizing the use of fertilizers and pesticides through recycling, composting, and the distribution of animal manures. Share what you learned with your helper.



Agribusiness Domesticate Feedlot



The animals used in meat production are called **domesticated** animals.

These animals have learned to depend on people for their food and shelter. In this Word Search, find the names of animals that have been domesticated by people around the world.

Word List

buffalo	hog
camel	horse
cat	llama
chicken	ostrich
cow	oxen
dog	pigeon
duck	rabbit
elephant	sheep
goat	turkey
	yak

L	H	I	M	G	J	K	P	M	K
T	N	J	D	O	G	C	S	Y	T
V	U	M	U	A	B	D	W	A	R
B	G	R	C	T	L	O	O	K	M
M	N	E	K	C	I	H	C	E	S
Z	O	L	F	E	A	R	T	M	B
T	E	E	H	K	Y	M	S	W	U
I	G	P	R	Y	M	H	E	L	F
B	I	H	K	C	C	R	J	L	F
B	P	A	D	I	N	F	E	A	A
A	T	N	R	H	O	G	C	M	L
R	Q	T	Y	O	G	J	K	A	O
E	S	T	H	R	X	U	I	B	T
O	V	R	J	S	Y	E	K	Z	X
E	X	P	E	E	H	S	N	D	E

See page 12 for the key.

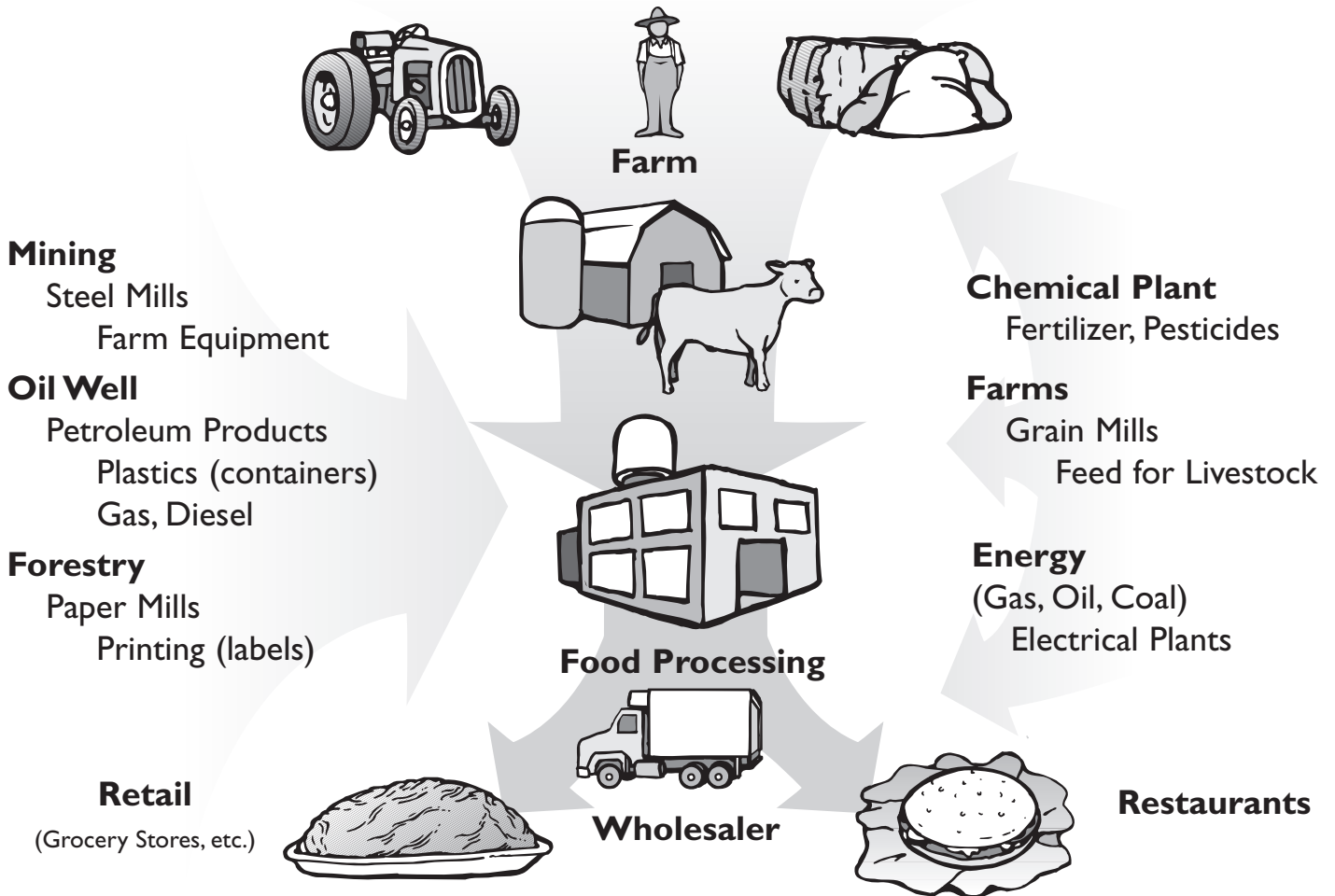


The production of meat sold in supermarkets starts at the farm where animals are raised specifically for their meat. These animals can range from rabbits and emus to cattle and buffalo.

Americans, however, primarily eat meat from beef cattle, swine, and sheep.

Take a look at the many businesses and industries associated with meat production. In fact, when all of the interconnected components of the industry are included, agribusiness is the largest industry in the United States. Many industries and trained professional people are needed to bring meat from the farm to your table.

From Farm to Consumer



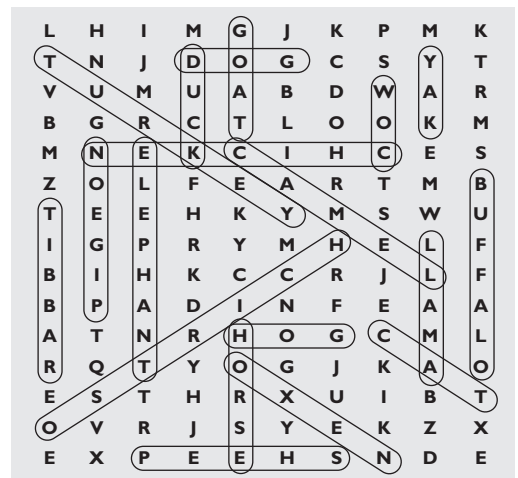
United States Department of Agriculture,
<http://www.usda.gov/news/usdakids/index.html>



Beef is not the only product provided by cattle. A very important by-product of the beef production business is leather made from cattle skins. One of the oldest leather products, dating back to the fourth century, is the leather riding saddle. Today we use leather to make such things as wallets, watch bands, boots, clothes, furniture, luggage, drum heads, automobile interiors, and athletic shoes!

We also produce many products from the bones and horns of cattle, such as glue, marshmallows, photographic film, and chewing gum. Fats are used to make soap and fertilizer, and medicines are made from animal glands and internal organs. Very little is lost when processing beef cattle. (from *Rare and Well Done*, by John Drury)

Word List Key (from page 12)



Meat at the Market

It is said, "Meat makes the meal." In meal planning, the meat selection often determines all other aspects of the meal – side dishes, bread, salad, and beverage. We may eat steak with potatoes, meatballs with spaghetti, bacon with eggs, and ham with green beans. As meat is usually the main focus of a meal, the average American spends approximately 25 percent of his or her weekly food budget on meat. Since meat uses a substantial portion of our weekly food budget, it is important to learn how to properly identify and evaluate different cuts of meat to make wise meat purchases.

Explore and Discover

Visit a supermarket and investigate the meat section of the store. Make a list of eight different cuts of meat available for purchase. Using the meat labels, determine from what animals the meat cuts originated. Describe the features you notice about the meat cuts you have selected.

Activity: Becoming familiar with meat cuts available to the consumer

Life Skill: Learning to learn and problem solving

Science Process Skill: Organizing and gathering data

Achievement Check: You can describe several retail cuts of meat

Virginia SOLs: Science 6.1, Life Science 12

National Science Standard: Different kinds of questions suggest different kinds of scientific investigations. Some investigations involve observing and describing objects

Materials: Pencil, calculator

ACTIVITY

4

Meat name	Animal source	Comments
-----------	---------------	----------

Examples:

--	--	--

Ground Beef	Cattle	ground up in small pieces; no bones
-------------	--------	-------------------------------------

--	--	--

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Were you surprised by the number of meat cuts available to purchase? Were you surprised by the variation among different packages of the same cuts of meat? Discuss what you observed and learned with your helper.



To purchase the correct quantity of meat for a meal, it is important to know:

- The number of servings per pound you can expect to get from the selected meat cut. (You can refer to a table in most cookbooks for this information.)
- That a “serving” is about the size of a deck of cards.
- What cooking method you plan to use. (There is more shrinkage in meat cooked at a high temperature or for a longer period of time than in meat cooked at a moderate temperature or for a shorter period of time.)
- The appetites of the people invited to your meal.
- The amount of additional food that will be served with the meat.

Using the table at the bottom this page and a calculator, determine how much of the following meats you should buy for six dinner guests.

Meat	Amount of meat needed
Beef Porterhouse steak	_____
Pork back ribs	_____
Lamb cubes	_____
Beef chuck roast	_____
Pork center loin	_____
Lamb loin chops	_____

The following table shows a few meat cuts and their servings per pound based on an average serving of 2 1/2 to 3 1/2 ounces per portion.

Beef	servings/pound	Pork	servings/pound	Lamb	servings/pound
Flank steak	3	Loin chops	4	Loin chops	3
Porterhouse steak	2	Smoked chop	4	Rib chops	3
Rib steak	2	Leg roast	3	Leg roast	3
Rib eye steak	3	Center loin	2 1/2	Shoulder	2 1/2
Round rump roast	3	Back ribs	1 1/2	Breast	2
Chuck roast	2	Tenderloin	4	Cubes	4



Let's Talk

How do you determine the cost per serving of the meat that is selected for a meal?

From what types of animals did you find the most meat cuts on your visit to the supermarket? Why do you think these meats were the most available?

Let's Reflect

Why is it important to know the cost per serving when planning a weekly food budget?

What is the relationship you see between cost per serving and types of meat?

Let's Use It

How does knowing the cost per serving affect the meat choices that you make?

How does knowing unit costs help you in selecting any item that you purchase?



Bacteria present in meat products make it extremely important to clean and sterilize all items that come in contact with the meat, including your hands. Always wash your hands with hot soapy

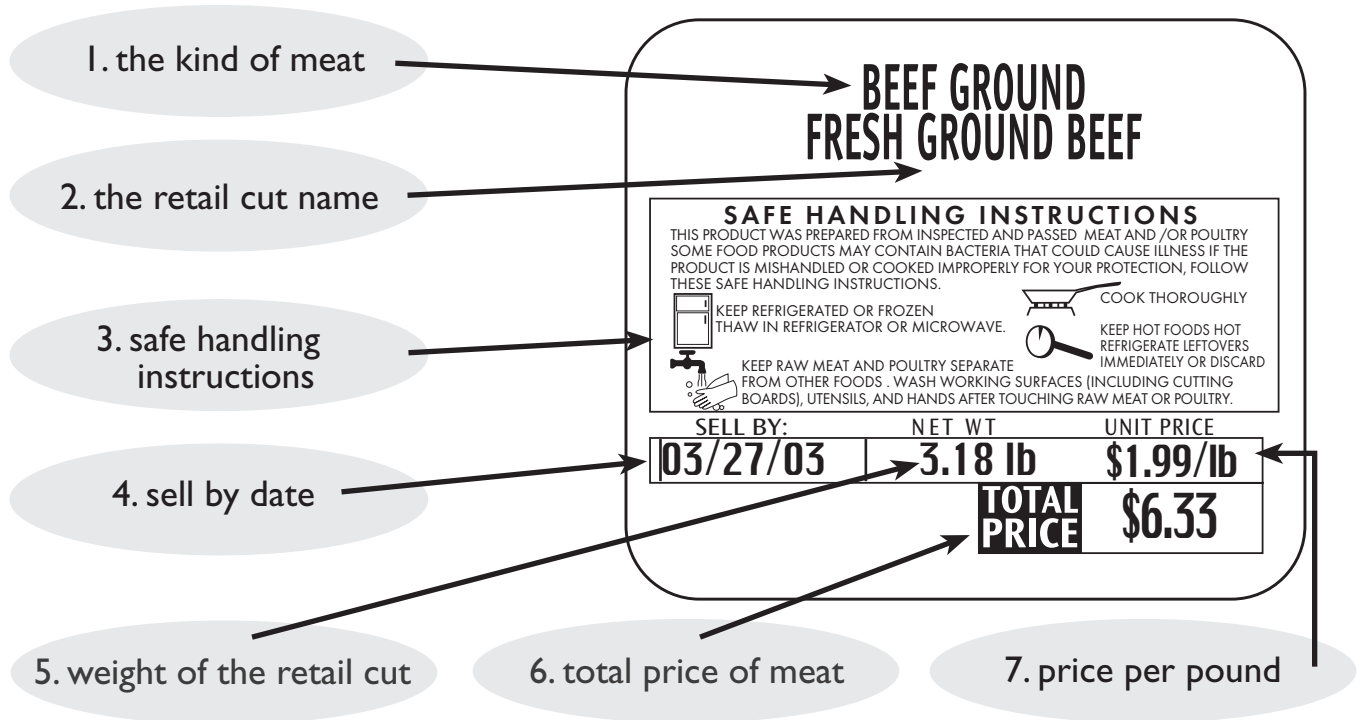
water before and after food preparation. It is also important to use soap and hot water to wash all utensils, knives, and cutting surfaces that have been used when cutting meat. You should have a separate cutting board used only for cutting raw meat, and you should never cut cooked meat on the same cutting board as raw meat. Sanitation will prevent illnesses caused by food-borne bacteria.



Reading the Label

The information on the meat label helps you identify and evaluate a retail cut of meat. It also helps you purchase the appropriate amount of meat and suggests the best cooking method for the event you are planning. The information on the meat label helps you stay within your food budget.

The label on most retail cuts of meat will provide the following information:



(Source: The Kroger Food Co., Cincinnati, Ohio)



1. Visit a supermarket meat department.

Observe the cutting and packaging of fresh cuts of meat. Share what you saw and learned with your group or helper.

2. Visit a supermarket meat counter. List the prices per pound of five kinds of meat and calculate the price per ounce (remember there are 16 ounces in a pound). Compare these prices with the price per ounce of other supermarket products. Which products are the most expensive per ounce?



Bacteria



United States Department of Agriculture Food Safety and Inspection Service
www.usda.gov/agency/fsis/homepage.htm
 Food Safety, www.FoodSafety.gov

Partnership for Food Safety Education, www.fightbac.org

Label Reading and Advertising; VCE publication 348-921



In the earliest years of this nation's history (1636), one of our Puritan fathers, William Pynchon, set up America's first commercial meat

packing plant in Springfield, Massachusetts. This packing plant was one of the first industries established by the early colonists. Pynchon packed and shipped pork, sold beaver skins, and handled mutton, tallow (animal fat), and wool from a large, log warehouse along the Connecticut River.

Upon Pynchon's return to England, the meat packing plant was left in the hands of his son, John. John Pynchon was responsible for the first recorded cattle drive in the United States when he sent a herd of cattle from Springfield to Boston in the spring of 1655 (from *Rare and Well Done*, by John Drury).

Answers to More About Meat: Beef Porterhouse steak 3 lb.; Pork loin 2.4 lb.; Lamb loin chops 2 lb.; back ribs 4 lb.; Lamb cubes 1 1/2 lb.; Beef chuck roast 3 lb.; Pork center

Bits about Beef

Drive down Main Street, USA and you will probably see an array of different restaurants advertising hearty meals to lure you inside. Many of these restaurants promote a specialty food. Think about restaurant specialties and you will note many of them are made from beef, such as hamburgers, roast beef sandwiches, steak, Mexican beef tacos, or Italian meatballs and lasagna. Beef is the favorite meat of Americans. In fact, beef makes up about 2/3 of the meat eaten in the United States. Americans eat about 69 pounds of beef per person each year.

Explore and Discover

Beef comes from cattle that are specially raised for meat production. Once these cattle are raised to an appropriate size they are sent to a meat processing plant where they are processed and cut into **wholesale cuts**. Wholesale cuts are large cuts of **carcass** that are sent to the supermarket. The supermarket butcher cuts the wholesale cuts into smaller **retail cuts**, which are packaged and sold to the consumer. When purchasing a retail cut of beef, knowing its original location on the carcass (its wholesale cut) gives you an indication of how tender the meat will be and how it should be prepared.

Look at the Beef Chart below. This chart shows the wholesale cuts of beef on a complete beef carcass. Specific retail cuts are carved from each wholesale cut and sold to the consumer. Study the chart and discuss the different cuts and their locations with your helper.

After studying this chart, go to the beef carcass diagram on page 18, and fill in the blanks with the correct wholesale cuts. Were you able to identify the wholesale cuts without referring back to this Beef Chart? Keep practicing until you can.

Activity: Identifying wholesale and retail beef cuts

Life Skill: Critical thinking and learning to learn

Science Process Skill: Organizing and classifying information

Achievement Check: You can identify wholesale beef cuts

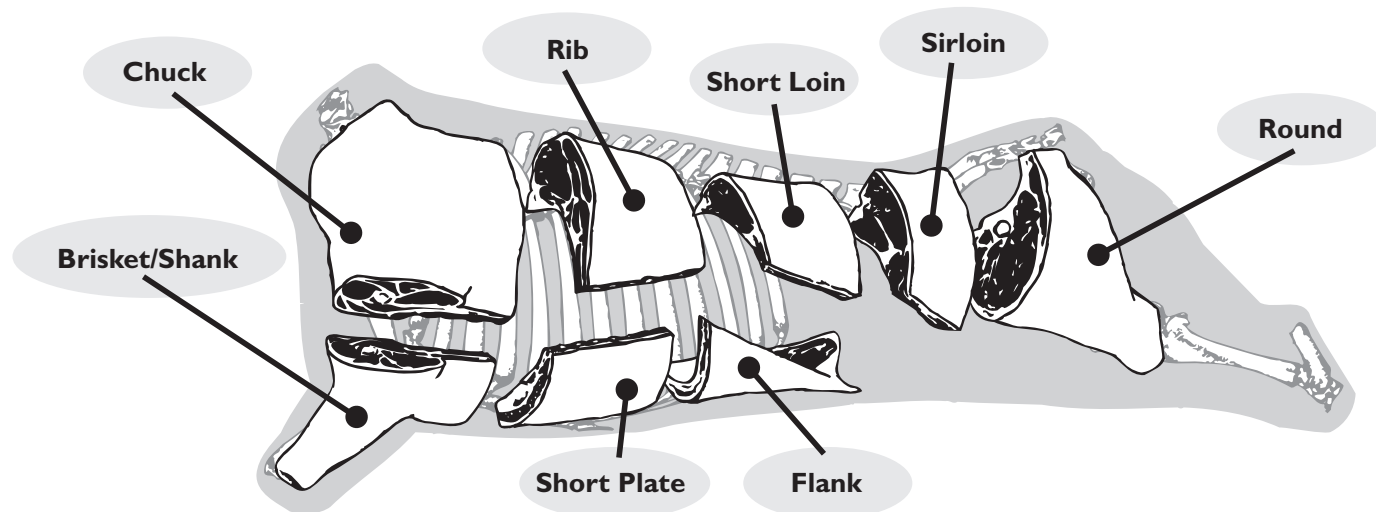
Virginia SOLs: Science 6.9, Life Science 3, 12

National Science Standard: Groups of specialized cells cooperate to form a tissue, such as a muscle

Materials: Pencil, calculator

5

Beef Chart





A steer is not all steak! From the data in the following table you can see that a 1,000-pound steer does not yield 1,000 pounds of meat. Its hide (skin and hair) alone may weigh as much as 100 pounds. In addition, the shanks, head, and intestines will reduce the original 1,000 pounds to about 615 pounds of carcass.

Live weight	Wholesale Cuts	Wholesale Weight	Retail Weight	% Useable Meat
1000 pounds	Chuck	164.8 lb.	134.3 lb.	_____
	Rib	59.0 lb.	47.5 lb.	_____
	Loin	105.8 lb.	77.7 lb.	_____
	Round	137.8 lb.	83.8 lb.	_____
	Flank	32.0 lb.	15.8 lb.	_____
	Plate	51.0 lb.	40.8 lb.	_____
	Brisket	23.4 lb.	9.4 lb.	_____
	Ground Beef	19.1 lb.	19.1 lb.	_____
			Total Retail Weight	432.0 lb.
			Total Fat and Bone	183.0 lb.
			Total Carcass Weight	615.0 lb.

Using a calculator, determine the percentage of the wholesale cut that is used in the final retail cut (retail cut divided by the wholesale cut). Which wholesale cut produces the greatest loss of useable meat (smallest % of usable meat)? Which wholesale cut produces the least amount of loss (greatest % of usable meat)? Answers below.



United States Beef Industry

Beef cattle production is one of the most important components of the United States agriculture industry. Grass and other forages are abundant in many parts of the United States, and beef cattle can use these forages to produce a source of income on land that might otherwise be unproductive.

Beef cows produce calves, which are usually **weaned** at about nine months of age. The calves may go on to **pasture** for further growth, or they may go to a feedlot to be grown out and finished for market. Most cattle raised in Virginia are sent to the Midwest states to be finished for market. Virginia is considered a “feeder” state in the cattle industry.

The young male beef animal, called a **steer**, is ready for processing at about 18 months of age. Each steer weighs from 1,050 to 1,350 pounds and produces about one half of the live weight in the form of retail cuts for the consumer. Beef today is **fabricated** in the slaughter plant and sold as packaged cuts of trimmed (and often boneless) cuts to the supermarket. Some plants even produce retail cuts that are packaged and ready for sale when they leave the processing plant.



Leftover cooked meats should be refrigerated or placed in the freezer within two hours after serving. To speed cooling, divide large portions into smaller portions. Share your list with your helper.



Carcass	Fabricated
Pasture	Retail Cut
Silage	Steer
Wean	Wholesale cut



National Cattlemen's Beef Association,
<http://www.beef.org>

Virginia Beef Industry Council,
<http://www.vabeef.org/>

Beef Promotion and Research Board
<http://www.beefboard.org/>

How to Beef Up Your Dollar; VCE publication 458-003

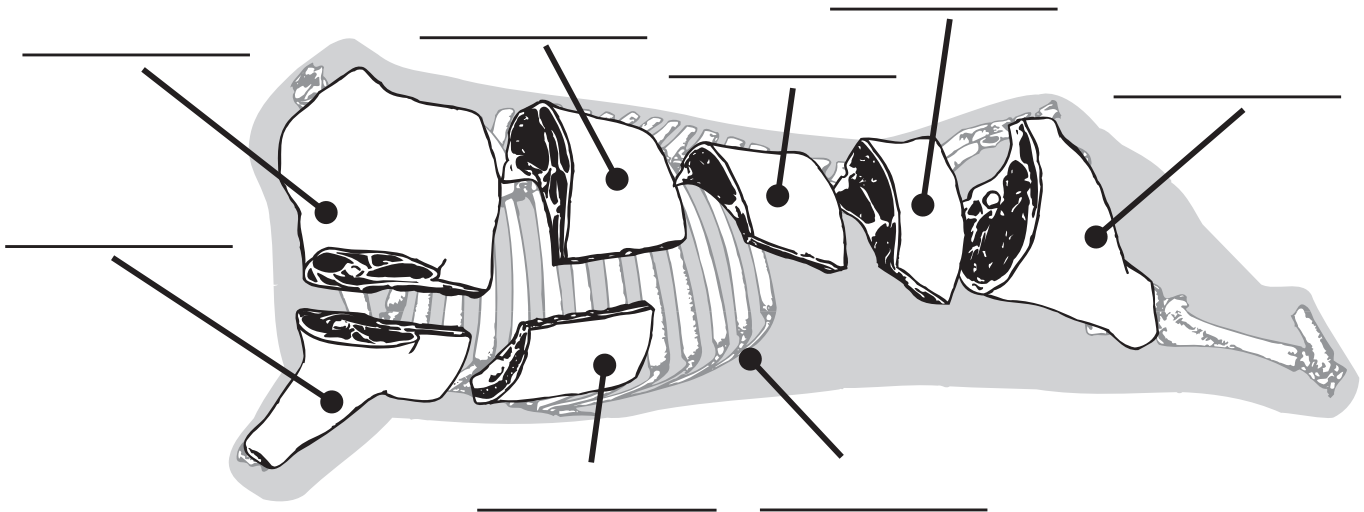


The most famous of all the cattle routes in the Old West was the celebrated Chishom Trail, named after the Cherokee trader, Jesse Chishom. This long, dusty trail ran for almost a thousand miles from San Antonio, Texas, to Abilene, Kansas. Texas longhorn steers were driven to Abilene where the new Union Pacific Railroad took them to Chicago, Kansas City, and east. In the late 1860s and early 1870s, herds of up to three thousand head of cattle were moved in a single cattle drive. Westward expanding railroads ended these historic cattle drives, leaving us today with the rowdy tales of unruly cowboys and their cattle driving exploits (from *Rare and Well Done*, by John Drury).

Answers to More About Meat: Chuck 81%; Rib 81%; Loin 73%; Round 61%; Flank 49%; Short Flank 80%; Brisket 40%; Shank 100%

Explore and Discover

Wholesale Beef Cuts Activity



1. Prepare a list of the amounts and kinds of retail cuts of meat that your family eats in one week. How many times did you eat beef? What type of meat does your family enjoy the most?

Circle the types your family enjoys the most.

Amount

Kind

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

2. Visit a beef cattle farm or feedlot. Ask questions about the production of beef cattle. Prepare a presentation on your visit, and share what you learned with your helper or group. List the amounts and kind of retail cuts of meat your family eats in one week.



Let's Talk

Why is it helpful to know the wholesale cut from which a retail cut is obtained when making meat selections?

How does knowing a cut of meat's region make you a better meat consumer?

Let's Reflect

Why is it important to obtain information on a product before purchasing it?

What questions do you ask before you make a selection? Do you consider quality, size, end use, and cost?

Let's Use It

How does finding the answers to these questions help you become a better consumer?

How does learning about the wholesale cuts and which part of the animal they come from help you become a better consumer?

Hog Heaven

Baseball America's favorite past time ... the crack of the bat, the roar of the crowd, the seventh inning stretch, and the smell of peanuts and popcorn. Then, to top off an exciting day at the ball park, there's nothing like a juicy hotdog covered in ketchup, mustard, and relish.

It is interesting how we associate different events in our lives with different foods and how many of these foods come from pork. Think about it. We often eat pork barbecue at sports events, corn dogs at the county fair, pork ribs at a family reunion, and grilled pork sausages on a beach vacation.

Pork is the meat from **swine (pigs or hogs)**. Next to beef, Americans eat more pork than any other meat. The average American eats about 54 pounds of cooked pork per year. Pork products include ham, bacon, pork chops, and many kinds of sausages.

Explore and Discover

In this activity you will learn more about pork cuts and pork products. Look at the Pork Chart below, showing the wholesale cuts of pork. The chart will help you learn the names of pork wholesale cuts. Study the chart and discuss the different cuts and their locations on the carcass with your helper.

After studying this chart, go to the pork carcass diagram on page 21, and fill in the blanks with the correct wholesale cuts. Were you able to identify the wholesale cuts without referring back to this Pork Chart? Keep practicing until you can.

Activity: Identifying wholesale and retail pork cuts

Life Skill: Critical thinking and learning to learn

Science Process Skill: Gathering and analyzing data

Achievement Check: You can identify wholesale pork cuts

Virginia SOLs: Science 6.9, Life Science 3, 12

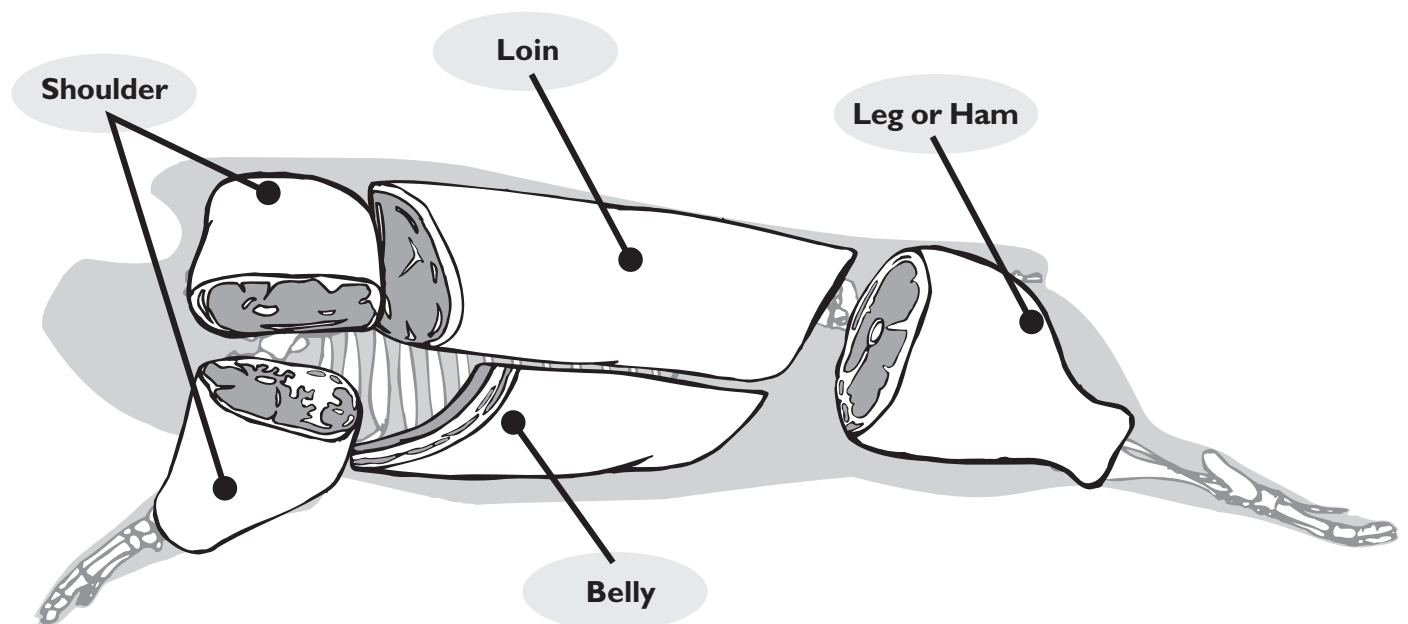
National Science Standard:

Mathematics is important in all aspects of scientific inquiry

Materials: Pencil, calculator

6

Pork Chart





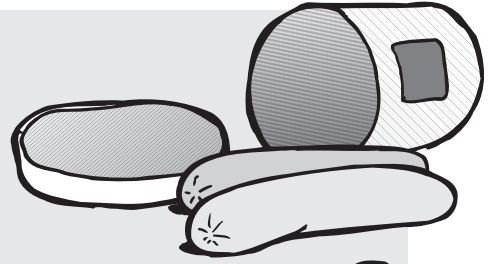
Servings of Pork per Pound

Approximate Number of Servings Per Pound

Types of Pork

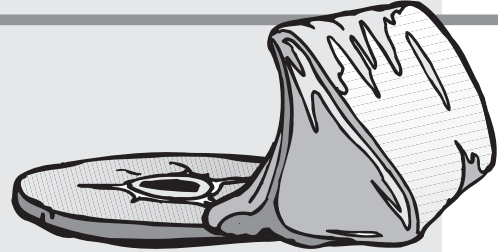
4

Boneless Meats: Canadian bacon, tenderloin, top loin roast, pork cubes, ground pork, liver, sausage, hotdogs, sliced luncheon meats, and smoked ham



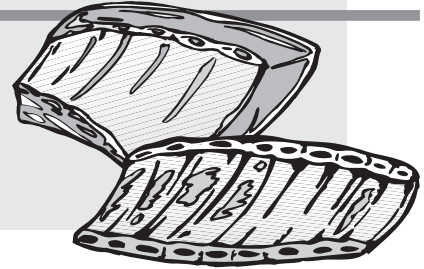
2-3

Meats with Medium Amount of Bone: ham slices, sirloin roast, center loin roasts, chops, rump roasts, loin roasts, blade steak



1-2

Meats with Large Amounts of Bone: shoulder cuts, back ribs, country style ribs, spareribs



Visit a supermarket and select a cut of pork from each type listed in the chart above. Write down the cost per pound of each meat selection. Determine how many pounds of meat from each group you would need to feed your family or your group. Using the costs per pound, determine the most economical meat cut to serve. Write your calculations below:

Boneless Pork

Name of pork cut: _____ Cost per pound: _____

Pounds of meat needed to feed family or group: _____ Cost per serving: _____

Medium Amount of Bone

Name of pork cut: _____ Cost per pound: _____

Pounds of meat needed to feed family or group: _____ Cost per serving: _____

Large Amount of Bone

Name of pork cut: _____ Cost per pound: _____

Pounds of meat needed to feed family or group: _____ Cost per serving: _____

Which meat type is the most expensive to serve? _____

Which meat type is the least expensive to serve? _____



Let's Talk

What types of pork products do you enjoy the most?

What qualities of hogs make them such excellent meat producing animals?

Let's Reflect

What wholesale cuts of the hog provided the most expensive retail cuts? What wholesale cuts provided the least expensive retail cuts?

Why is it important in meal planning to know the number of servings per pound of meat?

Let's Use It

How does knowing the relationship between the wholesale cut and the retail cut of pork help you in making better pork selections for an occasion?

Why is it important to know the price per unit weight when selecting and purchasing any food product?



Producing Pork

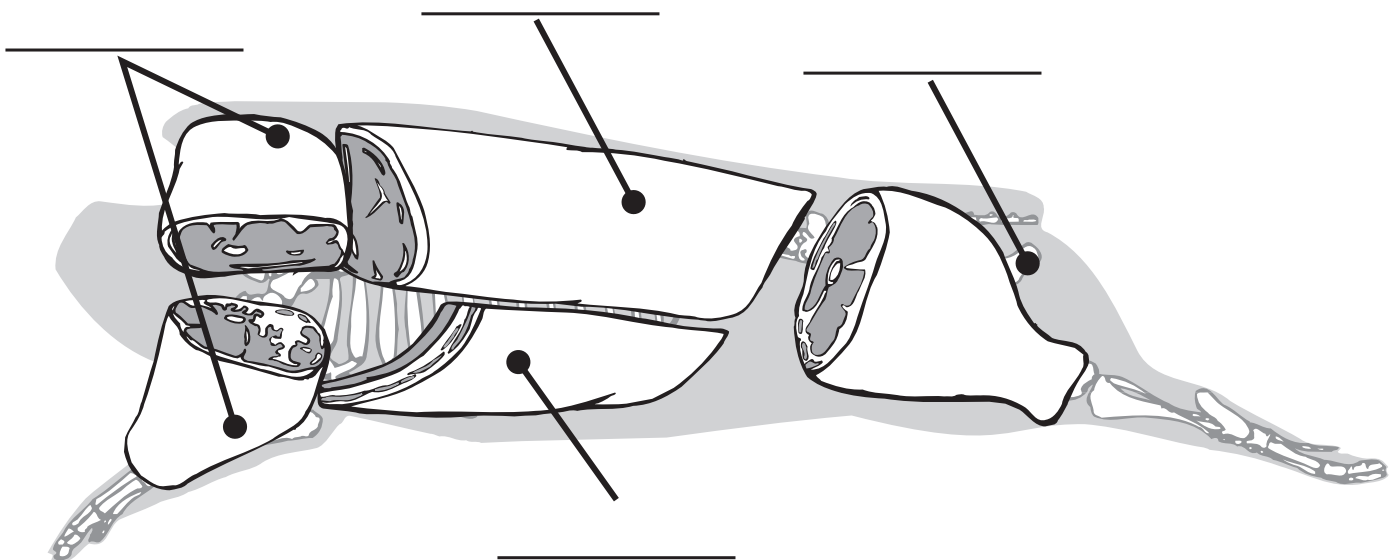
Swine have a digestive system very similar to that of humans. Cattle and sheep, on the other hand, have a more complex digestive system which enables them to digest grass, hay, and other plant materials. The diet of swine must be more digestible, so they are fed mixtures of grains that provide a more concentrated source of nutrition.

Swine today are primarily raised in confinement. Swine production units use concrete floors, heat, ventilation, and frequently include automated water and feed systems. These highly efficient operations enable producers to market a swine weighing 230 to 250 pounds at 5 to 6 months of age. Of the 100 million swine raised annually in the United States, about 85% are raised from birth to market in some type of confinement system.

Some pork producers specialize in producing feeder swine. Female swine, called **sows**, are kept to produce **litters** of young swine. The piglets are sold to other producers, at about eight weeks of age, to be raised into swine for processing.

Explore and Discover

Wholesale Pork Cuts Activity





In the past a **parasite** called *Trichinosis spiralis* occasionally could be found in pork. To destroy this parasite, it was once recommended that pork be heated to an internal temperature of 160° to 170°F. Thoroughly cooking pork at these temperatures provides a margin of safety, but we now know that heating the meat cut to 137°F will destroy this organism. Today's production methods result in pork that is unlikely to contain the trichina organism.



Bovine	Hog	Hybrid
Litter	Ovine	Parasite
Porcine	Sow	Swine



National Pork Board, <http://www.porkboard.org/>
 National Pork Producers Council, <http://www.nppc.org/>
Stretch Your Pork Dollar, VCE publication 458-921



1. Visit a library and check out a book about meat or livestock production. Find out more about this important branch of agribusiness.

2. Using the Internet, find out about the many breeds of swine used for production in the United States. Many of these breeds are developed into "hybrids". Which breeds are used to make hybrids in the United States?
3. Animals are grouped based on similar characteristics. For example, canines (members of the dog family) include foxes, wolves, coyotes, dingos, and domestic dogs. Research and make a list of the animals included in the **ovine** (sheep), **porcine** (swine), and **bovine** (cow) families. Share your list with your group or helper.



Have you ever heard of a football being called "pigskin"? About 500 BC, Greeks played a game called "harpaston." Harpaston made use of a ball that was kicked, passed, or carried on a field marked with goals. It is not known what the Greek ball was made of, but evidence from a similar game played during the height of the Roman Empire indicates that the ball was made of the inflated bladder of the lowly pig a pigskin! (from *Rare and Well Done*, by John Drury)

Learning about Lamb

Imagine you have decided to dine at the fanciest restaurant in town. You are seated at a nice table and handed a menu. After ordering some ice tea, you glance down at the menu and find that all of the entrées are selections from lamb and sheep! Would you order any of these selections? Americans are not known for their consumption of meat from sheep so finding only lamb and mutton on the menu would probably be a big surprise!

You may not know it, but lamb is the meat from a sheep less than one year of age. Mutton is the name given to meat from older sheep and most mutton is consumed as some form of cooked or processed meat. Americans do not eat a large amount of lamb or mutton. In fact, the average amount of lamb eaten per person in the United States is less than one pound of cooked lamb per year. Compare that to the 69 pounds of beef or the 54 pounds of pork each American eats each year!

Explore and Discover

Despite the fact that Americans eat little **lamb** or **mutton**, it is still a meat product that is produced in large quantities in the United States. In 2001, 4 million pounds of lamb were produced in the United States, but another 135 million pounds of lamb were imported, with Australia and New Zealand being the source of more than 98 percent of that product.

By now you should be starting to understand how the live weight of an animal is reduced to retail cuts representing only a portion of the live animal. Lambs are no different from cattle and hogs in this respect. Look at the Lamb Chart below, which shows the wholesale cuts of lamb.

Study the Lamb Chart and discuss the different wholesale cuts and their locations with your helper. Using the diagram of the lamb carcass on page 25, fill in the blanks with the correct wholesale cuts.

Activity: Identification of wholesale and retail lamb cuts

Life Skill: Decision making and learning to learn

Science Process Skill: Organizing and classifying information

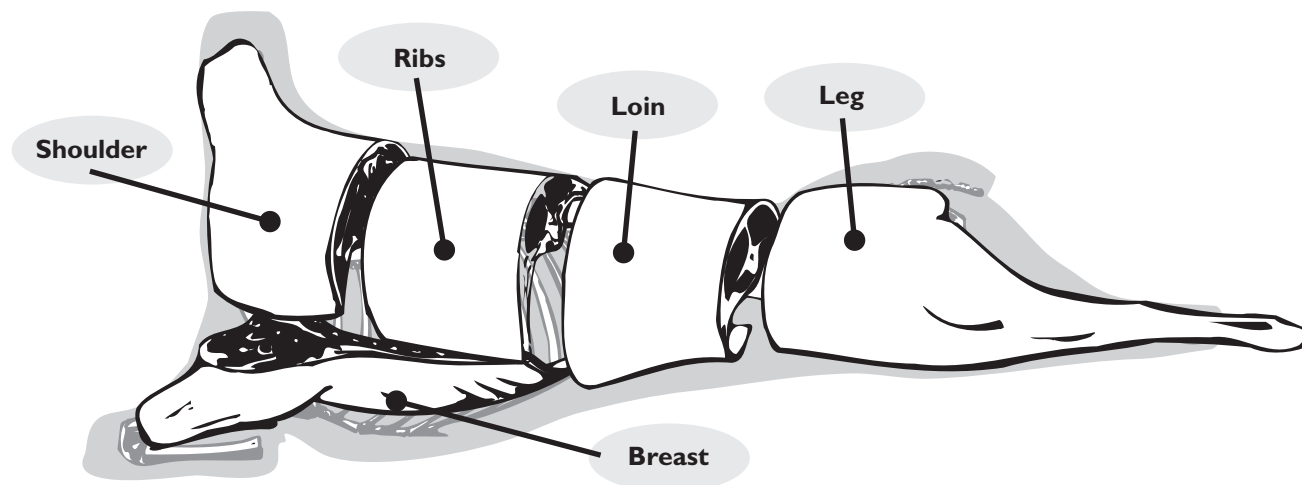
Achievement Check: You can identify wholesale cuts of lamb

Virginia SOLs: Science 6.9, Life Science 3, 12

National Science Standard: Groups of specialized cells cooperate to form a tissue, such as a muscle






Materials: pencil, cookbook

Lamb Chart





After studying the Lamb Chart, refer to your cookbook and complete this table by selecting a single retail cut from each wholesale cut of lamb and describing how it is cooked.

Wholesale Cut	Retail Cut	Cooking Method
Shoulder		
Rib		
Loin		
Leg		
Breast		

Why do you think different cuts of lamb require different cooking methods? Can you determine the choicest cuts of lamb by their suggested cooking method? From which wholesale cut are the most tender cuts of lamb produced?



Let's Talk

Fresh lamb is primarily available in the spring and early summer months of the year. How do you think this affects the amount of fresh lamb that is eaten by

Americans every year?

How did knowing the different wholesale cuts of beef and pork help you learn the different cuts of lamb? How are they the same? How are they different?

Let's Reflect

Sheep can thrive in mountainous pastures where other domesticated animals cannot. How do you think this fact about sheep has influenced the popularity of mutton and lamb around the world?

Why is it difficult to try something new to eat?

Let's Use It

How might the seasonal availability of different meats coincide with cultural traditions associated with different American secular and religious holidays such as Thanksgiving, Christmas, Kwanzaa, Passover, and Easter?

What other traditions are part of your family's history? How are these traditions passed on to the next generation?



Lamb Production in Virginia

The production of lamb is important in Virginia, particularly in the Shenandoah Valley and Southwest Virginia. Sheep can use grass and other forages for food, and they require only a limited amount of grain for healthy growth. Sheep excel in converting plant material into delicious and nutritious animal protein.

Young lambs are usually born in the winter or early spring. They grow rapidly on grass and their mother's milk and go to markets weighing about 110 pounds. A single lamb will produce about 35 pounds of meat for sale to the consumer.

Sheep produce two products that are useful to people—meat and wool. Older sheep are sheared once each year producing about 7 pounds of wool per sheep. Wool is used to make clothing that is particularly valued for its warmth and beauty. It is also used for carpets, upholstery, and other home furnishings. New developments such as shrink-proofing and permanent press techniques have made wool almost as versatile as man-made fibers.

People living in the northeast part of the country consume much of the lamb produced in the United States. Virginia is close to this market area and is able to produce high quality spring lambs, which are much in demand. Much of the rest of the nation's sheep production is in the western states where sheep are grown under range conditions.



1. Write a short paragraph describing why some retail cuts of meat need moist cookery and some can be cooked dry. Share your paragraph with your helper.

2. Much lamb is consumed by various ethnic and religious groups. Peaks of lamb consumption occur around certain religious holidays celebrated by these groups. Find out more about these holidays and the tradition of eating lamb. Share what you learn with your helper.
3. Plan a family menu for one week using a variety of retail cuts of meat. Share your menu with your helper.
4. Using the Internet, find out about the many different breeds of sheep that are used for the production of lamb and mutton. Which breeds of sheep are raised in the United States? Which breeds of sheep are raised in other parts of the world?



Lamb

Mutton



American Sheep Industry Association,
<http://www.sheepusa.org>

Sheep Production in Virginia; VCE publication 410-025

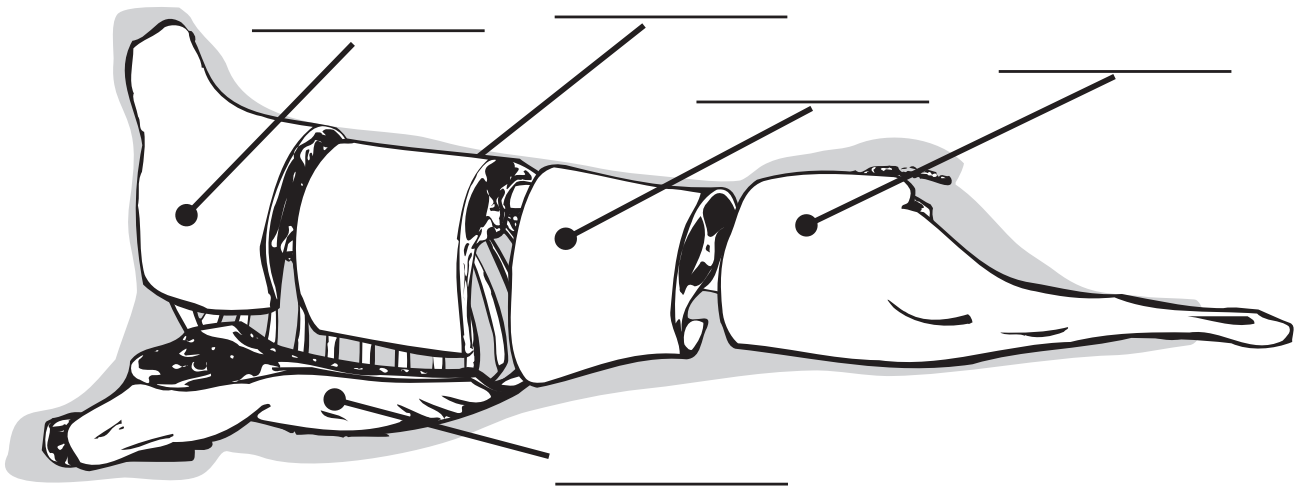
Stretch Your Dollar with Lamb; VCE publication 458-005



Detroit butcher George H. Hammond received his fish shipments from Lake Superior in “ice boxes”(wooden boxes filled with ice). In 1869, Hammond made history when he combined the ideas of shipping fish in iceboxes, the rapidly growing U.S. railroad systems, and shipping meat to far off markets. Filling a rail car with beef and blocks of ice, Hammond sent out the world’s first refrigerated train car from Detroit to Boston. The invention of refrigerated rail cars played a major role in the development of the meat industry and the availability of meat to all regions of the United States (from *Rare and Well Done*, by John Drury).

Explore and Discover

Wholesale Lamb Cuts Activity



Selecting and Cooking Meat

Different occasions call for serving different cuts of meat. For an informal occasion you might consider serving hamburgers and hotdogs or a nice steak cooked over an outdoor grill served with potato salad, corn-on-the-cob and watermelon. For a formal occasion, you might plan an elegant, sit-down meal with all of the trimmings. For this meal you could select a leg of lamb or pork tenderloin to serve with baked potatoes, salad, and your fanciest dessert. In this activity you will discover that knowing where on the animal different retail cuts of meat are located helps you select and cook the best cuts of meat for different occasions.

Activity: Selecting and cooking retail cuts of meat

Life Skill: Making healthy life choices and decision making

Science Process Skill: Gathering and analyzing data

Achievement Check: You can cook a variety of meat cuts

Virginia SOL: Science 6.1, 6.9, Life Science 12

National Science Standard: Selection of foods and eating patterns determine nutritional balance, which has a direct effect on growth, development, and personal well-being

Materials: Pencil, 3 retail cuts of meat, cookbook

Explore and Discover

In the early 1970's the National Live Stock and Meat Board developed a standardized system of labeling meat that would allow meat shoppers in different cities or states to identify meat cuts by name rather than by sight. The system is called the Uniform Retail Meat Identity Standards (URMIS), which includes a master list of over 300 standardized names for retail cuts of beef, veal, pork, and lamb. The URMIS Label includes:

1. The kind of meat: beef, veal, pork or lamb. It is listed first on every label.
2. The wholesale cut; for example, chuck, rib, loin, or round. It tells where the meat comes from on the animal.
3. The retail cut; for example, blade roast, spareribs, loin chops, etc. It tells from what part of the wholesale cut the meat originated.



**BEEF GROUND
FRESH GROUND BEEF**

SAFE HANDLING INSTRUCTIONS
THIS PRODUCT WAS PREPARED FROM INSPECTED AND PASSED MEAT AND /OR POULTRY SOME FOOD PRODUCTS MAY CONTAIN BACTERIA THAT COULD CAUSE ILLNESS IF THE PRODUCT IS MISHANDLED OR COOKED IMPROPERLY FOR YOUR PROTECTION, FOLLOW THESE SAFE HANDLING INSTRUCTIONS.

KEEP REFRIGERATED OR FROZEN THAW IN REFRIGERATOR OR MICROWAVE. COOK THOROUGHLY. KEEP HOT FOODS HOT REFRIGERATE LEFTOVERS IMMEDIATELY OR DISCARD.

KEEP RAW MEAT AND POULTRY SEPARATE FROM OTHER FOODS. WASH WORKING SURFACES (INCLUDING CUTTING BOARDS), UTENSILS, AND HANDS AFTER TOUCHING RAW MEAT OR POULTRY.

SELL BY:	NET WT	UNIT PRICE
03/27/03	3.18 lb	\$1.99/lb
TOTAL PRICE		\$6.33

**PORK LOIN
TOP LOIN CHOPS BONELESS**

SAFE HANDLING INSTRUCTIONS
THIS PRODUCT WAS PREPARED FROM INSPECTED AND PASSED MEAT AND /OR POULTRY SOME FOOD PRODUCTS MAY CONTAIN BACTERIA THAT COULD CAUSE ILLNESS IF THE PRODUCT IS MISHANDLED OR COOKED IMPROPERLY FOR YOUR PROTECTION, FOLLOW THESE SAFE HANDLING INSTRUCTIONS.

KEEP REFRIGERATED OR FROZEN THAW IN REFRIGERATOR OR MICROWAVE. COOK THOROUGHLY. KEEP HOT FOODS HOT REFRIGERATE LEFTOVERS IMMEDIATELY OR DISCARD.

KEEP RAW MEAT AND POULTRY SEPARATE FROM OTHER FOODS. WASH WORKING SURFACES (INCLUDING CUTTING BOARDS), UTENSILS, AND HANDS AFTER TOUCHING RAW MEAT OR POULTRY.

SELL BY:	NET WT	UNIT PRICE
03/27/03	3.18 lb	\$3.99/lb
TOTAL PRICE		\$12.69

**CHOICE BEEF RIB
RIBIYE STEAK LIP ON BONELESS**

SAFE HANDLING INSTRUCTIONS
THIS PRODUCT WAS PREPARED FROM INSPECTED AND PASSED MEAT AND /OR POULTRY SOME FOOD PRODUCTS MAY CONTAIN BACTERIA THAT COULD CAUSE ILLNESS IF THE PRODUCT IS MISHANDLED OR COOKED IMPROPERLY FOR YOUR PROTECTION, FOLLOW THESE SAFE HANDLING INSTRUCTIONS.

KEEP REFRIGERATED OR FROZEN THAW IN REFRIGERATOR OR MICROWAVE. COOK THOROUGHLY. KEEP HOT FOODS HOT REFRIGERATE LEFTOVERS IMMEDIATELY OR DISCARD.

KEEP RAW MEAT AND POULTRY SEPARATE FROM OTHER FOODS. WASH WORKING SURFACES (INCLUDING CUTTING BOARDS), UTENSILS, AND HANDS AFTER TOUCHING RAW MEAT OR POULTRY.

SELL BY:	NET WT	UNIT PRICE
03/27/03	3.17 lb	\$7.99/lb
TOTAL PRICE		\$25.33

(Source: The Kroger Co., Cincinnati, Ohio)

For this activity you will need to take a trip to the meat section of your local supermarket or use cuts of meat that you already have at home. Select three retail cuts of beef, pork, or lamb from three different wholesale cuts. Write down the information found on each on the labels provided below.

SAFE HANDLING INSTRUCTIONS

THIS PRODUCT WAS PREPARED FROM INSPECTED AND PASSED MEAT AND /OR POULTRY. SOME FOOD PRODUCTS MAY CONTAIN BACTERIA THAT COULD CAUSE ILLNESS IF THE PRODUCT IS MISHANDLED OR COOKED IMPROPERLY FOR YOUR PROTECTION, FOLLOW THESE SAFE HANDLING INSTRUCTIONS.

KEEP REFRIGERATED OR FROZEN
THAW IN REFRIGERATOR OR MICROWAVE.

KEEP RAW MEAT AND POULTRY SEPARATE FROM OTHER FOODS. WASH WORKING SURFACES (INCLUDING CUTTING BOARDS), UTENSILS, AND HANDS AFTER TOUCHING RAW MEAT OR POULTRY.

COOK THOROUGHLY

KEEP HOT FOODS HOT
REFRIGERATE LEFTOVERS IMMEDIATELY OR DISCARD

SELL BY: _____ NET WT _____ UNIT PRICE _____

TOTAL PRICE

SAFE HANDLING INSTRUCTIONS

THIS PRODUCT WAS PREPARED FROM INSPECTED AND PASSED MEAT AND /OR POULTRY. SOME FOOD PRODUCTS MAY CONTAIN BACTERIA THAT COULD CAUSE ILLNESS IF THE PRODUCT IS MISHANDLED OR COOKED IMPROPERLY FOR YOUR PROTECTION, FOLLOW THESE SAFE HANDLING INSTRUCTIONS.

KEEP REFRIGERATED OR FROZEN
THAW IN REFRIGERATOR OR MICROWAVE.

KEEP RAW MEAT AND POULTRY SEPARATE FROM OTHER FOODS. WASH WORKING SURFACES (INCLUDING CUTTING BOARDS), UTENSILS, AND HANDS AFTER TOUCHING RAW MEAT OR POULTRY.

COOK THOROUGHLY

KEEP HOT FOODS HOT
REFRIGERATE LEFTOVERS IMMEDIATELY OR DISCARD

SELL BY: _____ NET WT _____ UNIT PRICE _____

TOTAL PRICE

SAFE HANDLING INSTRUCTIONS

THIS PRODUCT WAS PREPARED FROM INSPECTED AND PASSED MEAT AND /OR POULTRY. SOME FOOD PRODUCTS MAY CONTAIN BACTERIA THAT COULD CAUSE ILLNESS IF THE PRODUCT IS MISHANDLED OR COOKED IMPROPERLY FOR YOUR PROTECTION, FOLLOW THESE SAFE HANDLING INSTRUCTIONS.

KEEP REFRIGERATED OR FROZEN
THAW IN REFRIGERATOR OR MICROWAVE.

KEEP RAW MEAT AND POULTRY SEPARATE FROM OTHER FOODS. WASH WORKING SURFACES (INCLUDING CUTTING BOARDS), UTENSILS, AND HANDS AFTER TOUCHING RAW MEAT OR POULTRY.

COOK THOROUGHLY

KEEP HOT FOODS HOT
REFRIGERATE LEFTOVERS IMMEDIATELY OR DISCARD

SELL BY: _____ NET WT _____ UNIT PRICE _____

TOTAL PRICE

(Source: The Kroger Co., Cincinnati, Ohio)

Use the Meat Charts located in Activities 5, 6, and 7 find the wholesale cuts from which these retail cuts were produced. Where on the animals are each of these wholesale cuts located? Write the name of the wholesale cut under each label. Use the information from previous Activities to help you answer the following questions about the meat cuts you selected. Discuss your answers with your project helper.

- Which of the three cuts should be the most tender? _____
- Which cut was the most expensive per pound? _____
- Is there a connection between tenderness and cost? _____ Why do you think this does or does not occur? _____
- How does knowing the location of the wholesale cut from which a retail cut is produced help you in deciding which cut to serve for a specific occasion? _____



We cook meat to improve its tenderness, flavor, and texture. The amount of **connective tissue** in meat largely determines the method of cooking.

Since dry heat hardens connective tissue, tender meat cuts containing small amounts of connective tissue should be cooked using **dry heat methods**. Less tender cuts containing larger amounts of connective tissue should be cooked slowly using **moist heat methods** at low temperatures.

Dry heat methods for cooking tender cuts of meat include:

- Roasting - meats cooked at 325° F in an uncovered pan.
- Broiling - meats cooked *under* direct heat; especially good for meat 3/4 inch or less in thickness.
- Pan-broiling - meats cooked *over* direct heat; used for cooking thinner steaks or chops.
- Frying - meats cooked in a hot pan with only enough fat to prevent sticking.
- Grilling - meat cuts cooked on a grill over a flame.

Moist heat methods used for cooking less tender meat cuts include:

- Braising - the slow cooking of meat with a small amount of liquid in a covered utensil either on top of the range or in the oven at low temperatures (250-325° F).
- Simmering - the slow cooking of whole cuts of meat covered with liquid, not to exceed 195° F (boiling the liquid toughens the meat).
- Stewing - the slow cooking of small, cut-up pieces of meat covered with liquid, not to exceed 195° F.
- Steaming - the slow cooking of meat in foil or in pans with close-fitting tops or in a pressure cooker.

Check the labels of the three meats you selected for this activity. Do the labels give you cooking instructions? If not, look in a cookbook for cooking instructions for these three cuts of meat. How do the instructions differ between cuts?

Ask your helper or parent to help you cook a cut of meat as described by the label or in the cookbook. Plan, cook, and serve a meal including side dish, vegetable, and dessert using this meat cut as the main entrée.



What Makes Meat Tender?

The major component of meat is the muscle tissue of an animal. Connective tissue found attached to muscles allows the animal to bend and flex its muscles as it walks, lies down, stands up, or any other activity. More connective tissue is found in the legs, shoulders, and round muscles of animals since these are the muscles primarily involved in movement. The muscles found on the back (rib and loin areas) of an animal have less connective tissue because these muscles are not used for movement; rather they function to provide structure to the animal's body.

The tenderness of any retail meat cut is affected by the amount of connective tissue it contains. The most desirable meat cuts are steaks and roasts cut from the rib, loin, and sirloin wholesale cuts because they contain less connective tissue. These tender cuts are the most expensive cuts of meat. Retail cuts containing more bone and connective tissue are less expensive and more economical for the consumer.

Muscle can be successfully cooked with any type of heat. Connective tissue, however, requires not only heat but also moisture to be broken down during cooking. Cuts from the loin, rib, and sirloin, with much less connective tissue, can be cooked with dry heat methods (grilling, broiling, etc.). Cuts from the chuck, with greater connective tissue, often require a moist cooking method (stewing, braising, etc.) to make them more tender. Cuts from the round are somewhat between these two extremes regarding tenderness and connective tissue.



Let's Talk

Why is it important to know how to cook different cuts of meat?

Which type of cooking method did you enjoy using the most? Why?

Let's Reflect

How does the preferred cooking method factor into your selection of a cut of meat?

How does a cookbook help in selecting a meat cut and cooking method?

Let's Use It

Describe a time when you had to make choices based on the constraints of a budget. Why is having a budget important to making informed decisions?

How does a budget determine which items you can purchase?



Frozen meat may be thawed before cooking or cooked without thawing. Slow thawing in the refrigerator is advised because the meat thaws more uniformly. Uniform thawing prevents the rapid bacterial growth that occurs at room temperature.



1. Leanness of meat refers to the ratio of fat to lean (muscle). Ground beef is leaner or less lean depending on where it comes from on the beef carcass. The three categories of ground beef are:

- a) not less than 73 percent lean
- b) not less than 80 percent lean
- c) not less than 85 percent lean

Which category of ground beef would be best used for a low calorie recipe? Which category needs to be cooked and drained of the fat before using? Which category might be best for inexpensive casseroles or meatballs?

- 2. Cook three hamburgers, one on the outside grill, one under the oven broiler, and one in a skillet. Compare the finished products. Which one did you like the most? From your observations, how do you think the cooking method affected the taste?



Boar	Connective tissue
Dry heat methods	Entrée
Moist heat methods	Muscle



Food Preparation and Safety, VCE Fact Sheet 348-921
Food Storage Guidelines For Consumers, VCE Fact Sheet 348-960

A Consumer Guide to Safe Handling Preparation of Ground Meat, VCE Publication 458-016

University of Nebraska Meat Identification Webpage

<http://animalscience.unl.edu/meats/id/>

American Meat Institute; <http://www.meatami.com/>



When we think of Thanksgiving or Christmas celebrations we often think of dining on turkey, cranberries, and potatoes. However, in merry old England, during the Middle Ages, the symbol of holiday feasting was a boar's head decorated with an orange in its mouth and sprigs of green rosemary in its ears. Ancient Romans would serve up the entire boar as the first dish of their feasts. In times of old, serving a boar signified the conquest of man over nature. An ancient example of a "selecting meat for the occasion!" (from *Rare and Well Done*, by John Drury)

More to Meat than Meets the Eye

Processed Meat

Legend has it that during the Civil War one Southern family hid hams in their well to protect the hams from plundering Yankees. When the northern troops dropped by for a drink they found that the well water had a strange odor and flavor. Upon asking about the odd flavor of the water, the kitchen maid replied, "You shouldn't drink that water! We drop dead cats and every ol' thing down that well!" The Northern soldiers quickly left, leaving the Southern family to retrieve their hams to dry in the afternoon sun (from *The Ham Book* by Monette and Robert Harrell).

By now the names of retail meat cuts have started to become familiar. You can identify and select roasts, steaks, loins, and ribs of beef, pork, and lamb, but what about the other meats that we find at the supermarket such as Virginia hams or hotdogs, bologna, **sausage**, and kielbasa? What are they made of? Why are they different from the retail cuts of meat? These products are **processed meats** made from combinations of beef, pork, and seasonings processed to provide a wider selection of meats for our enjoyment.

Explore and Discover

To discover how simple it is to process meat, you can make pork sausage and beef jerky for your family to enjoy. Ask your helper to help you collect the ingredients found in these recipes. Remember to wash your hands thoroughly before and after handling raw meat.

Beef Jerky

Ingredients:

Marinade

2 lbs. lean beef 1 cup soy sauce 1 tablespoon Worcestershire sauce 1 teaspoon liquid smoke (optional)
1 teaspoon garlic salt 1 teaspoon black pepper or lemon pepper

1. Slice two pounds of lean beef (suggested cuts: flank, round, sirloin or rump cuts) into long 3/16" to 1/4" thick slices. Partially freeze the meat to allow for easier cutting.
2. Remove all the fat possible.
3. Mix together the marinade ingredients in a large saucepan. Bring to a boil.
4. Precook a few meat strips in the marinade making sure that they are covered by the marinade. Re-heat to a full boil for five minutes.
5. Remove the meat strips from the marinade using tongs.
6. Repeat steps 4 and 5 until all of the meat strips have been boiled in marinade.
7. Put these precooked strips in a single layer on the dryer racks of the dehydrator or oven. Dry the strips according to the times designated by the dehydrator, or at low heat (140°F) in the oven until done. Begin checking samples after 3 hours.
8. Test for doneness by bending a meat strip after drying. It should crack but not break, nor have any moist or undone spots.
9. Store your jerky in plastic freezer bags. For long term storage, put the jerky in a refrigerator or freezer.

Activity: Learning about processed and variety meats

Life Skill: Making healthy lifestyle choices and learning to learn

Science Process Skill: Observing and classifying information

Achievement Check: You can describe how processed meats are made

Virginia SOL: Science 6.1, Life Science 3, 12

National Science Standard: Personal and social factors—such as habits, family income, ethnic heritage, body size, advertising, and peer pressure—influence nutritional choices

Materials: pencil, recipe ingredients, dehydrator or oven

Pork Sausage

Ingredients:

10 pounds ground pork 2 to 3 oz table salt
1/2 oz black pepper 1/4 oz ground sage

1. Mix all the ingredients thoroughly.
2. Form into patties, cover and refrigerate for 12-24 hours.
3. Cook the patties over medium-high heat on a griddle or in a skillet until browned and cooked through.
4. Use within two days or wrap in air-tight paper and freeze.



Variety meats are more unusual retail cuts from cattle, swine, or sheep. Most of these cuts are considered **gourmet**. They are often found on fancy restaurant menus, but for the most part, they have limited appeal to the general public. In fact, most of the variety meats produced in the United States are exported to other parts of the world. Some of the most common variety meats are:

- Brains
- Chitterlings: intestines of swine or veal calves
- Hearts
- Hog maws: the stomach of a hog
- Kidneys
- Liver
- Oxtails: the tails of beef cattle
- Pigs feet, knuckles, ears and snouts
- Sweetbreads: the thymus glands of young beef
- Tripe: the lining of the stomachs of cattle
- Tongue

Visit a local grocery store and locate the variety meats. Have you ever tried any of these meats? Which variety meat would you like to try?

Select a variety meat to serve to your family. Learn how to cook your selection, and try something new!



Let's Talk

What was the most difficult part of making sausage and beef jerky? What was the easiest?

Why is it difficult for some people to try something new to eat?

Let's Reflect

What are some other unusual things that you would find hard to eat or do?

Describe how you feel after you have tried something new?

Let's Use It

People pass family recipes, stories and heirlooms from one generation to the next. How do you think traditions influence the types of foods eaten by different cultures? Can you give an example of a food or activity your family enjoys that have been passed down through family tradition?

Historically, why do you think that different cultures in the world have learned to eat most animal parts?



1. Interview an older person about his or her family's traditional foods. Find out how the foods they enjoy are connected to family experiences and history. Share what you learned with your helper.
2. There are many byproducts of meat production. The non-edible parts of an animal carcass are used in many ways, including cosmetics, industrial products, medicines, and of course leather goods. Find out what animal byproducts you use every day. Share what you discover with your helper.
3. Visit a delicatessen. Make a list of the different types of processed meats that are available. Share your list with your helper.



Processed Meats

Processed meats are made primarily from beef and pork. These meats are processed into a wide variety of products such as sausage, bologna, meat spreads, luncheon meats, bacon, hams, dried meat products, corned meat products, and canned meats. Many of the meats we eat every day are processed meats such as bacon or sausages for breakfast; luncheon meats or bologna for lunch time sandwiches; canned meat spreads on crackers for an afternoon snack; and grilled kielbasas for dinner. It is easy to see that processed meats are often part of a daily meal plan.

Processed meats are formulated in many ways. Companies that process meat may salt, season, smoke, dry, **cure**, or **pickle** combinations of beef and pork to make various products. Some of the spices used in processed meats include allspice, basil, cinnamon, cloves, coriander, dill, garlic, mustard, sage, rosemary and paprika. Sausage meat is ground, salted, spiced and stuffed into natural or artificial **casings**. Hotdog meat is ground, smoked and cooked, whereas hams are salted, smoked and cured. All of these methods were developed to preserve meat, prevent spoilage and to add flavor to the meat



Freeze recently purchased meat to prevent spoilage and to preserve quality if it is not going to be used within a few days of purchase.



Casings	Cure	Gourmet	Pickle
Processed meat	Sausage	Variety meat	



Dry-Curing Virginia Style Ham; VCE Fact Sheet 458-223
Virginia 4-H Ham Curing Project, VCE Publication 388-744

Making Jerky Safely, <http://www.uwyo.edu/CES/PUBS/Jerky.htm>

Drying Jerky, <http://www.uga.edu/nchfp/how/dry/jerky.html>

The Art and Practice of Sausage Making,
<http://www.ext.nodak.edu/extpubs/yf/foods/he176w.htm>



Many of the spices Christopher Columbus desired when he sailed west towards India were used to preserve meat. Black pepper, spices, and salt had been the principal means of preserving meats since the Middle Ages.

Meat preservation did not change decisively until the reign of Napoleon Bonaparte in the early 1800's. Realizing that "an army moves on its stomach," Napoleon announced a contest among the cooks and chefs of France asking for the best method of preserving meats for his troops. In 1810, cook Fancois Appert won the competition by successfully preserving meat in glass jars. The British replaced the jars with tin canisters (cans) for shipping foods overseas, and this practice continues today (from *Rare and Well Done*, by John Drury).

Introduction to Meat Judging

Every day provides opportunities to engage in decision making. Will you have toast or cereal for breakfast? Do you wear the brown shoes or the black shoes? Should you sign up for the soccer team or the school choir? We make many decisions every day.

Often, decisions are based on comparisons among several options or objects. For example, suppose you need to purchase a new shirt for the up-coming school dance. You first go to the store and compare a selection of shirts as to color, style, cost, quality, and fit. Then, you rank the shirts from the most desirable to the least desirable based on this set of criteria. Ranking the shirts allows you to select the shirt that best meets your needs.

The same types of judgments are made when shopping for and comparing cuts of meat. At the grocery store, you first identify the cut of meat that satisfies the needs of your meal. Then you look over and rank the many available packages of that particular meat cut. This process allows you to select the meat cut that best meets your needs. This is also the process that occurs during a meat judging competition.

Explore and Discover

Now that you have been introduced to meat production and meat selection and evaluation, you are ready to learn about another interesting meat activity—**meat judging** competitions. A meat judging competition is an opportunity to demonstrate your knowledge of meat cut identification and evaluation. Meat judging also involves ranking meat cuts based on a set of quality standards.

Meat judging and meat identification are two different activities in a meat judging competition. Meat identification is just that—naming the cut, describing where it comes from (what animal and what part of the carcass), and perhaps how it should be cooked. Meat judging is the ranking of a group of similar cuts from the best to the worst based on whatever standards are used to evaluate the cut.

Judging meat requires you to have a proficient knowledge of wholesale and retail meat cuts. You have already started learning about these cuts through the activities in this project book.

Activity: Introducing meat judging

Life Skill: Making decisions and learning to learn

Science Process Skill: Developing analytical, decision making, and communication skills

Achievement Check: You can describe and define meat judging

Virginia SOLs: Science 6.1, 6.9, Life Science 3, 5

National Science Standard: Creativity, imagination, and a good knowledge base are all required in the work of science

Materials: Pencil, resources on meat judging

10

Select two or three of the following activities to help you review what you have learned about meat identification, quality, and selection.

- Study pictures of meat cuts in books or on the Internet, and look carefully at actual meat cuts at the supermarket. Become familiar with the meat cuts available at the local supermarket or meat market. Practice meat cut identification.
- Become familiar with standards of meat quality such as the amount of lean and fat that is visible, marbling, texture, firmness, maturity, color, and color of fat.
- Collect a sampling of meat products and cuts. Discuss these products with a parent, helper, or your group. Remove the labels and practice identifying each meat product or cut.
- Collect several samples of two or more of the same meat cut (for example, two T-bone steaks or three blade roasts). Rate the similar cuts based on what you know about meat quality. Discuss your decisions with your helper.
- Study diagrams of beef, pork, and lamb carcasses. Become familiar with the wholesale and retail cuts from those carcasses. Describe the different wholesale and retail cuts to your helper.
- Take a tour of a meat production farm, meat processing plant, grocery store, or meat market. Ask the people in charge what they consider when evaluating meat products for quality.
- Attend a meat judging contest to observe a judge evaluating meat products.



A Look at Meat Judging

There are so many possible retail cuts of meat from so many different animals that identifying and evaluating a single cut can seem nearly impossible. To manage all of this information, you will need a system that will lead you to the correct name of the retail cut. An identification system of retail cuts can be developed based on an understanding of the bone structure (skeleton) and muscle structure (meat) of a meat animal carcass.

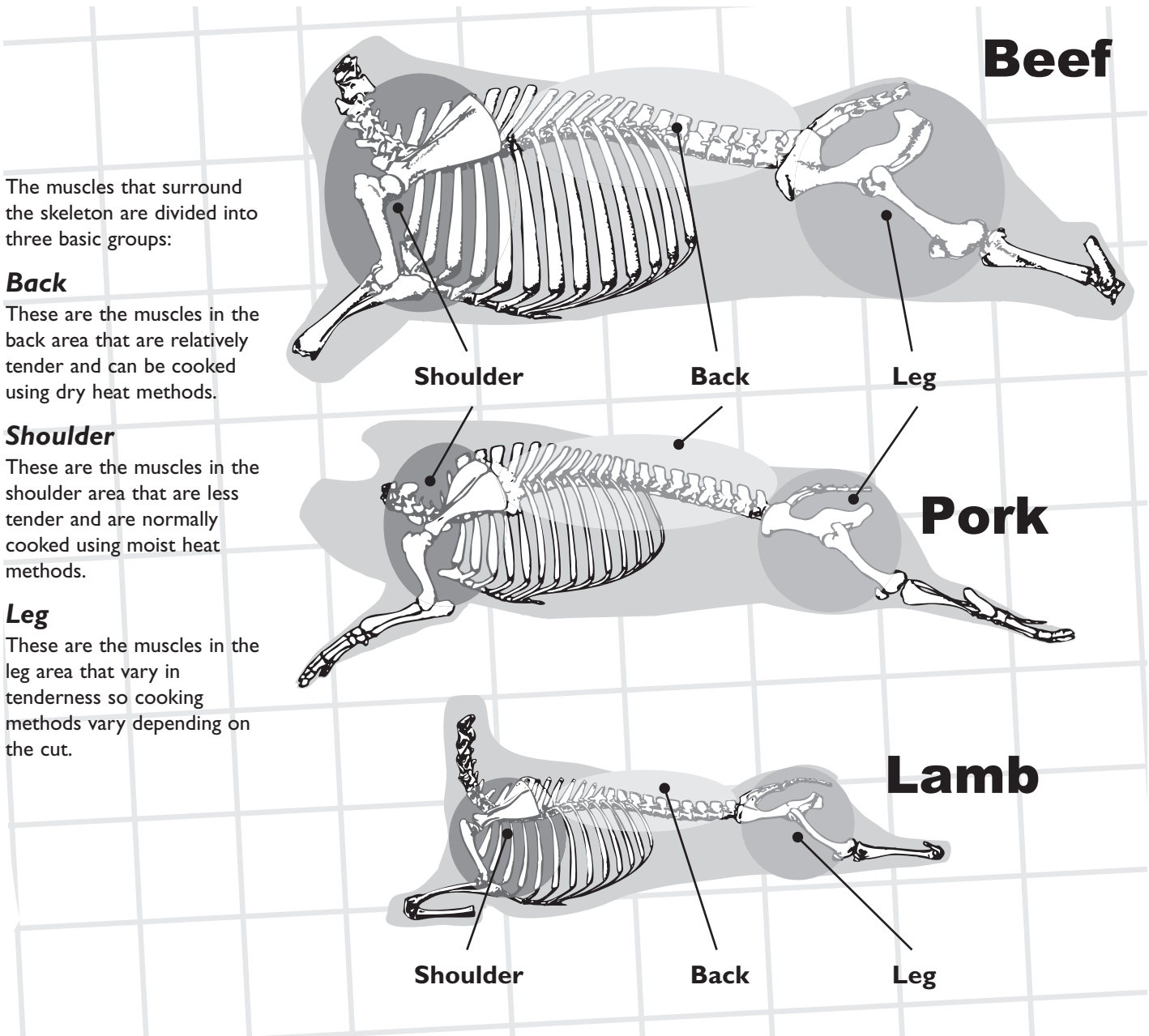
The skeleton is the solid framework of bones that supports an animal's muscle system. Many retail cuts are named according to the bones they contain, such as rib roasts, rib chops, T-bone steaks, and blade pot roasts. The skeletons of cattle, hogs, and sheep are very similar. Look at the skeletal structures of a hog and a cow. How are they the same? How are they different?

Seven Basic Cuts

The muscle and skeleton structure of cattle, swine, and sheep are similar, and their carcasses can be separated into seven parts that have similar muscle and bone arrangements. Each of the seven basic cuts contains certain bones, which will help in identification. These cuts are:

Arm Cuts Blade Cuts Rib Cuts Loin Cuts Sirloin Cuts Leg Cuts Breast Cuts

Can you identify the location of the seven basic cuts on each of the carcasses? You will improve your ability to judge meat cuts by familiarizing yourself with the skeleton and muscle structures of the meat production animals.



The muscles that surround the skeleton are divided into three basic groups:

Back

These are the muscles in the back area that are relatively tender and can be cooked using dry heat methods.

Shoulder

These are the muscles in the shoulder area that are less tender and are normally cooked using moist heat methods.

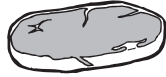
Leg

These are the muscles in the leg area that vary in tenderness so cooking methods vary depending on the cut.



Retail cut identification is the first step in meat judging. Match the name of the retail cut of beef with the picture of the retail cut.

Sirloin Steak



Round Tip Roast



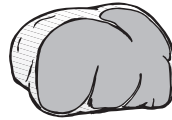
Brisket



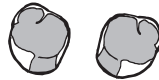
T-bone steak



Tenderloin Steaks



Ground Beef



1. Contact your local Virginia Cooperative Extension office and ask about meat judging opportunities in your area. Participate in or observe a County Meat Judging Contest.

2. Visit a meat packing plant. Observe the processing of carcasses and trace the route of the wholesale cuts to a retail store.

3. Observe the preparation and packaging of retail cuts at a grocery store.



Meat judging



Learning Through Judging, VCE publication 388-120
Meat Evaluation, University of Illinois at Urbana-Champaign, College of Agriculture, Cooperative Extension Service Publication 4-H 648L

Meat Evaluation Handbook, available from the American Meat Science Association, <http://www.meatscience.org/default.htm>

The Guide to Identifying Meat Cuts, available from the National Pork Board, <http://www.porkboard.org/PortStore/default.asp>

Texas A & M University meats extension
<http://aggiemeat.tamu.edu/index.html>

University of Nebraska Meats Science
<http://animalscience.unl.edu/meats/meats.htm>



Let's Talk

Taking notes is a helpful way to organize observations and thoughts. How would taking notes help you when you are judging meat?

How does knowing about the skeletal structure of an animal help you in identifying its different retail cuts of meat?

Let's Reflect

What are some of the similarities between meat cuts from beef, pork, and lamb? What are some of the differences?

How does knowing the wholesale cuts of a carcass help you in identifying the retail cuts?

Let's Use It

Describe a time when you had to make a choice between two objects. What facts did you use to make your decision? How did you make your final decision?

Why is it important to have a set of standards upon which to base a judgment?



The meat industry will continue to grow as people continue to enjoy the aromas and tastes of meat entrées at a fancy restaurant, chili dogs at a football game, and grilled steak on the Fourth of July. As a result, a variety of careers are available to those interested in the meat industry or other areas involved in food and agricultural production and distribution. Contact your local Virginia Cooperative Extension office for information on careers in the meat industry.

Appendix

Meat Grading and Inspection

What is Meat Grading?

In 1927 the United States Department of Agriculture (USDA) developed a grading system to identify the characteristics of meat that affect flavor, tenderness, and quality. Federal meat grading, however, is voluntary. Participating meat packers may request a federal grader to come to their meat plant to evaluate and grade selected carcasses. Once the grader has established the correct grade, he or she applies the grade stamp to the carcass. Many meat-packing plants grade their own meat and do not rely on federal grading. Meat is graded on:

1. Quality

The quality grade is an evaluation of the eating quality of the meat. Eating quality is based upon three factors: tenderness, juiciness, and flavor. The various factors which are related to these three components of eating quality are:

- **Marbling**

Marbling is the amount of fat within the meat. It is one of the most important factors affecting the quality of meat because the presence of fat increases the meat's flavor and tenderness. Marbling is also one of the qualities of meat that the consumer can evaluate just by looking.

- **Maturity**

Maturity relates to the actual age of the meat animal. An older carcass usually has more connective tissue which results in decreased tenderness of the meat.

- **Color, Firmness, and Texture**

Bright color, a firm consistency, and fine texture are indications of high quality meat. .

2. Yield

The yield grade describes the amount of meat that can be used in relation to the amount of fat and bone on a carcass. This grade is important to the customer who buys a whole or half (side) carcass of meat or a wholesale cut of meat.

What are the Meat Grades?

Meat labels often describe the meat as US Prime, Choice, Select, or Standard. These grades are based on a relationship between the marbling, maturity, and quality of the meat.

US Prime

This is the highest-grade meat that comes from young animals and has a large amount of marbling. US Prime cuts are sold at fine restaurants and at some meat stores.

US Choice

These meat cuts have an abundant amount of marbling for good taste, but do not cost as much as US Prime cuts. This grade is found most often in supermarkets or meat stores.

US Select

These meat cuts come from young animals and contain slight amounts of marbling. They are usually less costly and less tender than US Choice cuts. Select grade beef can be found in many supermarket meat cases.

US Standard

These meat cuts come from young animals, and contain almost no fat. These cuts are the least tender or juicy than the other graded cuts. Standard grade beef is not sold in supermarkets.

Meat Inspection

Although meat grading is voluntary, meat inspections are required by federal law. The purpose of meat inspection is to provide assurance to the consumer that the meat comes from healthy animals which were processed under humane and sanitary conditions. Meat is either inspected by a state or USDA supervised federal inspection program. Meat inspections are thorough, and guarantee that the meat is safe to eat. In addition, meat undergoes further inspections at processing plants, in supermarkets and meat markets, and in restaurant kitchens.

More on Meat Grading and Inspection

USDA Food Safety and Inspection Service

<http://www.fsis.usda.gov/>

Gateway to Government Food Safety Information

<http://www.foodsafety.gov/>

Quality Assurance Manual For The Food Industry; VCE Publication 458-013

Glossary

A

Agribusiness - the business of food production, processing, distribution, marketing, and sales.

Amino acids - a group of nitrogenous organic compounds that serve as units of structure of the proteins and are essential to human growth and metabolism.

B

Bacteria - one-celled microorganisms which have no chlorophyll, multiply by simple division, and can be seen only with a microscope.

Balance scale - an instrument for weighing, especially one that opposes equal weights, as in two matched shallow pans hanging from either end of a lever supported exactly in the middle; scales.

Beef - a full-grown ox, cow, bull, or steer, especially one bred and fattened for meat; meat from such an animal.

Boar - an adult male hog that is used for breeding.

Bovine - beef and veal producing animals.

C

Carbohydrate - an important class of foods in animal nutrition which supply energy to the body.

Carcass - the dead body of an animal, often specifically of a processed animal dressed as meat.

Carnivore - any animal that only eats meat; opposite of herbivore.

Casings - A natural or synthetic skin-like sheath into which meat and spices are stuffed to produce sausage.

Cattle - Domesticated bovine animals as a group; cows, steers, bulls, or oxen.

Cholesterol - a crystalline, fatty substance found especially in animal fats, blood, and nerve tissue. It is the basis for many important hormones in the body.

Connective tissue - body tissues that surround, support, and channel the activity of muscles. Some forms attach muscles to bones or bones to bones. Examples are ligaments, tendons, and collagen.

Consumer - a person who buys goods or services for his or her own needs and not for resale or to use in the production of other goods for resale.

Complete protein - a food that contains all of the amino acids needed for human health and growth.

Curing - a process developed as a way to preserve meat for use year round. Includes curing with smoke, salt, sugar, or brine (salt water).

D

Domesticate - to tame wild animals and breed them for the many purposes of man.

Dry heat method - any form of cooking that uses heated air such as braising, broiling, roasting, panfrying, panbroiling, or grilling.

E

Entrée - the main course of a meal.

Enzyme - any of various protein-like substances, formed in plant and animal cells, that act as organic catalysts in initiating or speeding up specific chemical reactions.

F

Fabricated - smaller pieces of fresh meat (but not retail cuts) cut from carcasses or wholesale cuts. Fabricated cuts are often boneless.

Feedlot - a fenced in area where meat production animals are fed and cared for until processing.

Food chain - a sequence of organisms in a community in which each member of the chain feeds on the members below it.

G

Gourmet - exceptionally fine food and drinks.

H

Ham - the upper part of a hog's hind leg, or meat from it, salted, dried, smoked, etc.

Herbivore - an animal that only eats plants; opposite of carnivore.

Hog - a porcine animal that is more than 4 months of age and weighs more than 120 pounds.

Hybrid - the offspring produced by crossing two individual plants or animals of different varieties or species.

I

Incomplete protein - a food that does not contain all of the amino acids needed for human health and growth.

L

Lamb - sheep (ovine) which is under 1 year of age, normally marketed at 5 to 10 months of age.

Litter - the young borne at one time by an animal which normally bears several young at a delivery.

M

Meat judging - to evaluate and rank meat cuts based on a set of standards.

Metabolism - the chemical and physical processes continuously going on in living organisms and cells.

Moist heat method - any form of cooking that uses hot liquid such as braising, simmering, stewing and steaming.

Muscle - Any of the body organs consisting of bundles of cells or fibers that can be contracted and expanded to produce bodily movements.

Mutton - the meat of a grown sheep over 1 year old.

O

Omnivore - an animal that eats any sort of food, especially both animal and vegetable food.

Ovine - referring to sheep.

P

Palatable - pleasant or acceptable to the taste; fit to be eaten or drunk.

Parasite - a plant or animal that lives on or in an organism of another species from which it derives sustenance or protection without benefiting the host and usually doing harm.

Pasture - grass or other growing plants used as food by grazing animals.

Pickle - Any brine, vinegar, or spicy solution used to preserve or marinate food.

Pig - a porcine animal that is less than 4 months of age and/or weighs less than 120 pounds.

Porcine - pork producing animals.

Pork - the flesh of a swine or a hog, used as food, especially when used fresh or uncured.

Processed Meat - mainly combinations of beef and/or pork that have been salted, smoked, dried, cured, or pickled to make various products such as bologna, sausage, meat spreads, canned meats, etc.

R

Retail cut - a cut of meat sold in small quantities directly to the consumer.

S

Satiety - the state of being satisfied; having had enough or more than enough.

Sausage - pork or other meat, chopped fine, highly seasoned, and either stuffed into membranous casings of varying size, such as bologna or salami, or made into patties for cooking.

Silage - green fodder (ex. cut grass, alfalfa) preserved in a silo.

Sow - an adult female hog that is either pregnant or has borne at least one litter of swine.

Steer - male bovine animals that have been castrated before having reached sexual maturity.

Swine - domesticated swine or hogs.

V

Variety meat - meat other than flesh; specifically, any of the edible organs such as the liver, kidneys, heart and brain.

Veal - flesh of an immature male or female cow, up to four months of age, that has been fed primarily milk or milk replacers.

W

Wean - to accustom a young animal to take food other than nursing.

Wholesale cut - large cuts of meat sold in relatively large quantities and usually at lower prices than at retail; especially cuts sold to retailers for further processing before sale to consumers.

Wholesome - promoting or conducive to good health or well-being; healthful.

Marvelous Meat

The Experiential Learning Model

The experiential learning model is used in each activity as a means to help the young person gain the most from the experience.

The five steps in this learning model encourage the young person to try to do the activity before being told or shown how. The experiential learning model asks youth to:

do the activity

Key Concept: Attention on the learner

Key Concept: Discovery

share what they did

Key Concept: Response to learning and feeling

Key Question: "What happened?"

process what was most important about the experience

Key Concept: Analyze patterns

Key Question: "What's important?"

generalize the life skill to their own lives

Key Concept: Inference

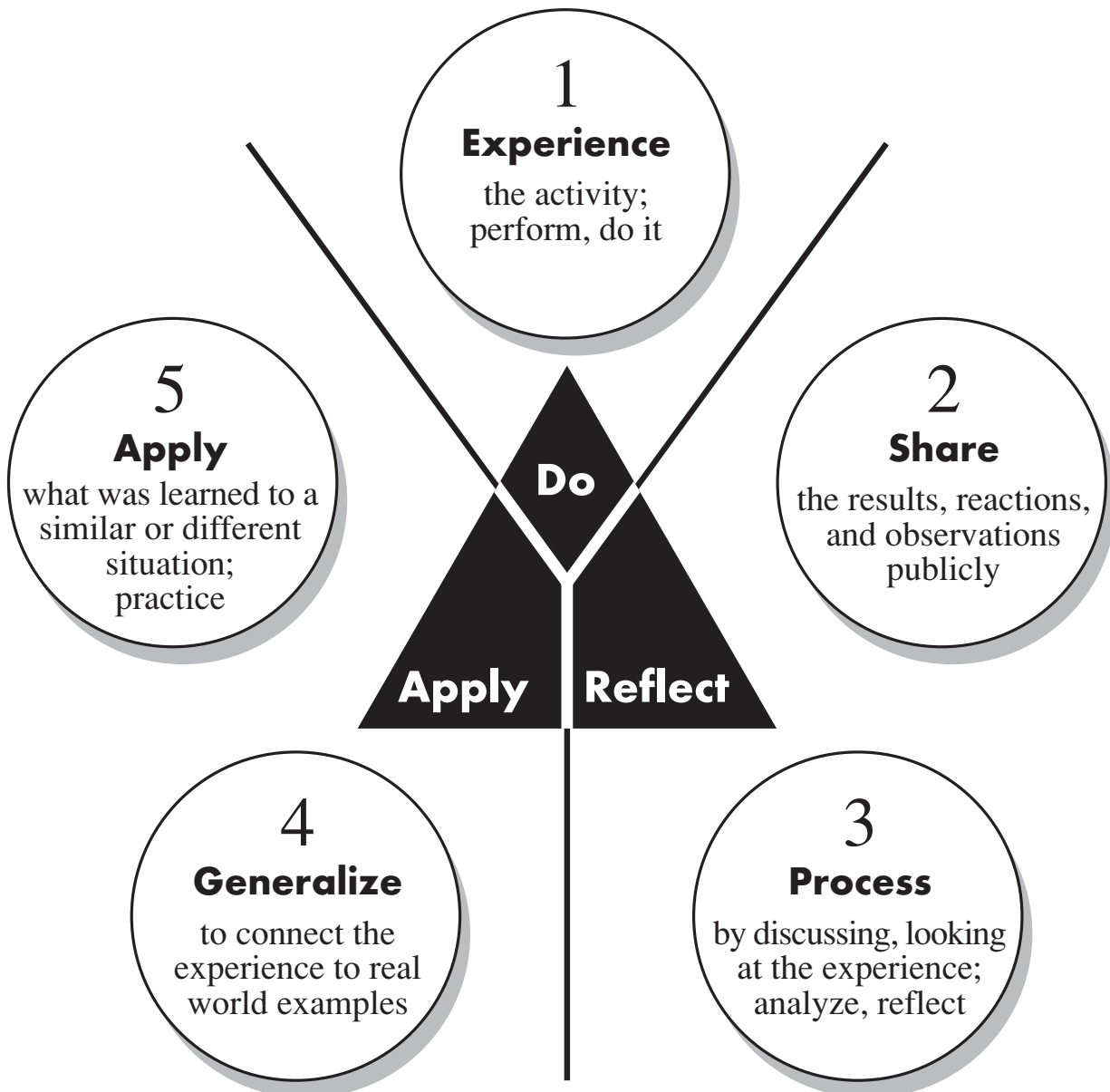
Key Question: "So what?"

apply the life skill or science process skill to a new situation

Key Concept: Application

Key Question: "Now what?"

To fulfill the experiential learning process, the youth must complete all the steps, including the review questions found in the Investigating Meat section of each activity. The experiential model enhances learning and adjusts to a wide variety of learning styles.





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