



Lesson One: Pigs and Pork

Level: High School

PURPOSE

Students will analyze pork production and products by diagramming cuts of meat and discussing how those cuts affect consumers.

NEBRASKA STATE EDUCATION CONTENT STANDARDS CONNECTION

SC.HS.4.4.d Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

AFNR.HS.2.2.b Analyze procedures to ensure that animal products are safe for consumption.

AFNR.HS.4.3.b Interpret how the chemistry of a food product ingredient affects the nutrition, processing, and characteristics of a final food product.

AFNR.HS.4.4.d Analyze the protein industry from harvest to table.

ESTIMATED TIME

50 minutes

MATERIALS NEEDED

- » World Meat Supply Chart
- » Pork Wholesale Diagram: Printed on colored cardstock or colored paper, 1 per student
- » Pork Wholesale Diagram: Printed on white cardstock or white paper, 1 per student
- » Pork Retail Cut List: Pre-cut, 1 set per every 2-3 students
- » Ziplock Bags or Small Envelopes to hold pork retail cut sets
- » Know the Nutrients in Pork handout, 1 per student
- » Know the Nutrients in Pork worksheet, 1 per student
- » Sticky notes or note cards
- » Optional: Access to Instagram or Facebook

VOCABULARY

Pork: Meat that comes from pigs, including loin chops, ham, bacon, tenderloin, sausage, and picnic roasts.

Retail Cut: Smaller cuts of meat purchased by the consumer at retail grocery outlets, also called “sub-primal”.

Wholesale Cut: Large cuts of meat into which the carcass of a food animal is divided and will be further broken down into retail cuts; also called “primal”.



BACKGROUND INFORMATION

Read or summarize the following information for students prior to the lesson:

Pigs, as the leading global meat supplier, are an important source of protein. In today's pork industry, pigs are born in a climate-controlled farrowing barn, where they are kept until they are approximately 21 days old. From there, they are weaned and moved to a nursery and eventually, a finishing barn.

Pigs will continue to be well cared for and well fed until they reach "market weight," which is between 250-280 pounds. At this time, they will be marketed or sold and processed into pork products. Examples of pork products include loin chops, ham, bacon, tenderloin, sausage, and 'picnic' roasts. Through the entire pig production process, careful measures are taken to ensure that pigs remain healthy. Safe pork comes from healthy pigs.

Part One: Learning Activity

INTEREST APPROACH

1. Ask students to consider where pork ranks in terms of total global meat consumption and share their predictions.
2. Show the *World Meat Supply Chart* and discuss that according to the Food and Agriculture Organization of the United Nations, pork ranks #1 in the world in total global meat consumption, with poultry ranking a close #2. Discuss factors that impact global meat consumption. Discuss the differences in pork and poultry compositionally and nutritionally.
3. Summarize by explaining that globally, many factors contribute to meat consumption trends such as feed and water source availability, income, religious and societal concerns, and consumer preferences. When considering poultry and many other types of meat, pork compares favorably for fat, calories, and cholesterol. For example, pork tenderloin is just as lean as skinless chicken breast and meets the government guidelines for extra lean.

CONDUCT ACTIVITY

Part One

1. Pass out the Pork Wholesale Diagram. Students will each receive 2 diagrams: one printed on colored paper, another printed on white paper.
2. Students will cut the colored Pork Wholesale Diagram apart. The following wholesale cuts will be individual pieces: Butt (Shoulder), Loin, Ham, Belly, Sparerib, Picnic, Jowl.
3. The white pork wholesale diagram will remain in one piece. Students will tape the colored pieces onto the white diagram as "flaps" that open and close. This can be accomplished with only one piece of tape on one side of each wholesale cut.



Part Two

4. Once students have created their interactive diagrams, move them into groups of 2-3. Give each group a set of a *Pork Retail Cut List*. Utilizing one student's diagram, students will attempt to group the retail cuts with the appropriate wholesale cuts from which they were derived. When students believe they have every cut in the right place, check their answers. As in the board game, Mastermind, do not tell students which cuts are wrong, rather instruct them as to how many cuts are misplaced. Students should consider amount of muscling, amount of fat, bones or lack thereof, and size or type of retail cut when making their initial placings on the diagram.
*Utilize the *Pork Retail Cut List Teacher Key* to check answers as you travel around from group to group.
5. Continue to have students re-organize until someone has "cracked the code" and correctly placed all retail cuts. Once the retail cuts have been correctly placed all students should capture the names of the retail cuts on the white (bottom) copy of their wholesale cuts diagram in the appropriate wholesale cut slots. This will enable them to study both wholesale cuts and the retail cuts they are cut into (by lifting the "flap").
6. Collect the retail cut identifier sets for future use.
7. Discuss activity:
 1. Which of the retail/wholesale cut combinations surprised you? Why?
 2. What are some of the general wants and needs of pork consumers around the world?
 3. What can the pork industry be doing to meet these wants and needs?
 4. Which cut(s) would you expect to be the leanest? Why?
8. Pass out the "Know the Nutrients in Pork" handout to students. Read aloud as a class or individually.
9. Utilizing the article, have students generate a "Privy to Pork," fact for the rest of the class. The fact should summarize a key point from the article related to the nutrition of pork but should not be verbatim what the article said. To share the fact, have students write it on a note card or sticky note and post in the room. Alternatively, as it is allowed by your school district, conduct a brief Instagram TV or Facebook Live spot of students sharing their "Privy to Pork" facts.
10. Alternatively, or in addition to the discussion, provide students the Pork Nutrients Worksheet and allow them time to complete.

FOLLOW UP QUESTIONS

1. What global challenges would exist surrounding the availability of pork as a nutrient source?
 - Feed availability, religious and cultural preferences, income.
2. What is the importance of protein in our diets? At what stages of life is protein especially critical?
 - Protein provides all of the essential amino acids needed by the body for growth and maintenance; essential amino acids cannot be made by the body – they must be supplemented in the diet. Protein is needed in the diet when growth and development needs are high such as childhood, adolescence, and pregnancy.



3. Summarize one of 9 key nutrients pork provides. What is its role within the body? Answers will vary:
- **Protein: Macronutrient.** Provides essential amino acids. Building block for bone, muscles, skin and blood. Important for growth and development. Key component to help the body repair cells and make new cells. Plays a role in the immune system and in making enzymes, hormones and other body chemicals.
 - **Selenium: Mineral/Trace Element.** Helps protect the body cells from damage. Plays a role in regulating thyroid hormone metabolism.
 - **Niacin: B Vitamin.** Helps convert food into energy. Essential for healthy skin, blood cells, brain and nervous system. Helps maintain a healthy cardiovascular system.
 - **Phosphorus: Mineral.** Helps build and protect strong bones and teeth. Key to maintaining normal pH in the body. Plays a role in shuttling nutrients in and out of body cells.
 - **Thiamin: B Vitamin.** Helps convert food into energy. Critical for growth, development and function of body cells. Helps maintain a healthy cardiovascular system.
 - **Vitamin B6: B Vitamin.** Needed for enzyme reactions involved in metabolism. Important for brain development during pregnancy and infancy. Plays a role in immune function.
 - **Riboflavin: B Vitamin.** Important for the growth, development and function of body cells. Helps convert food into energy. Important in maintaining normal vision and in preventing cataracts.
 - **Zinc: Mineral/Trace Element.** Found in all body cells. Critical for proper growth, development and reproduction and helps wounds heal. Needed to make proteins and DNA. Helps immune system fight off bacteria and viruses.
 - **Potassium: Mineral.** Balances body fluids and is needed for muscle contractions. Helps send nerve impulses and maintain a steady heartbeat. May help lower blood pressure.
4. How does pork compare to chicken? Does this surprise you?
- **Pork is comparable to chicken in terms of leanness; answers will vary.**
5. What is something new you didn't know about pork prior to reading the article?
- **Answers will vary.**



Part 2 (Optional): Attend a Virtual Field Trip

Biosecurity is a procedure to protect animals against disease. Farmers limit travel to their pig barns by practicing biosecurity. This ensures they can raise their pigs in a safe and healthy environment.

Virtual Field Trips allow farmers to open their barn doors to show students what happens inside. The farmer uses a tablet to connect with classrooms to be a part of a live, video-chat allowing students to have their questions answered in real time.

Visit the Nebraska Farm Bureau Foundation website, www.nefbfoundation.org/educators/get-involved/virtual-field-trips, to see a list of upcoming Virtual Field Trips and to sign up for a time to attend. If you have questions, please contact Nebraska Farm Bureau Foundation at foundationforag@nefb.org or (402) 421-4747.

SOURCES UTILIZED

Food and Agriculture Organization of the United Nations

www.fao.org/ag/againfo/themes/images/meat/backgr_sources_data.jpg

Pork Checkoff

www.pork.org/cooking/nutrition/compare/?gclid=Cj0KCQjwxzbzdBRCoARIsACzIK2nAPVRRETW6le-glOaypYrmHZwaTjG_oyBRsnN6ytc92GadXNMs974aAjRhEALw_wcB

NATIONAL AGRICULTURAL LITERACY OUTCOMES

Food, Health, & Lifestyle

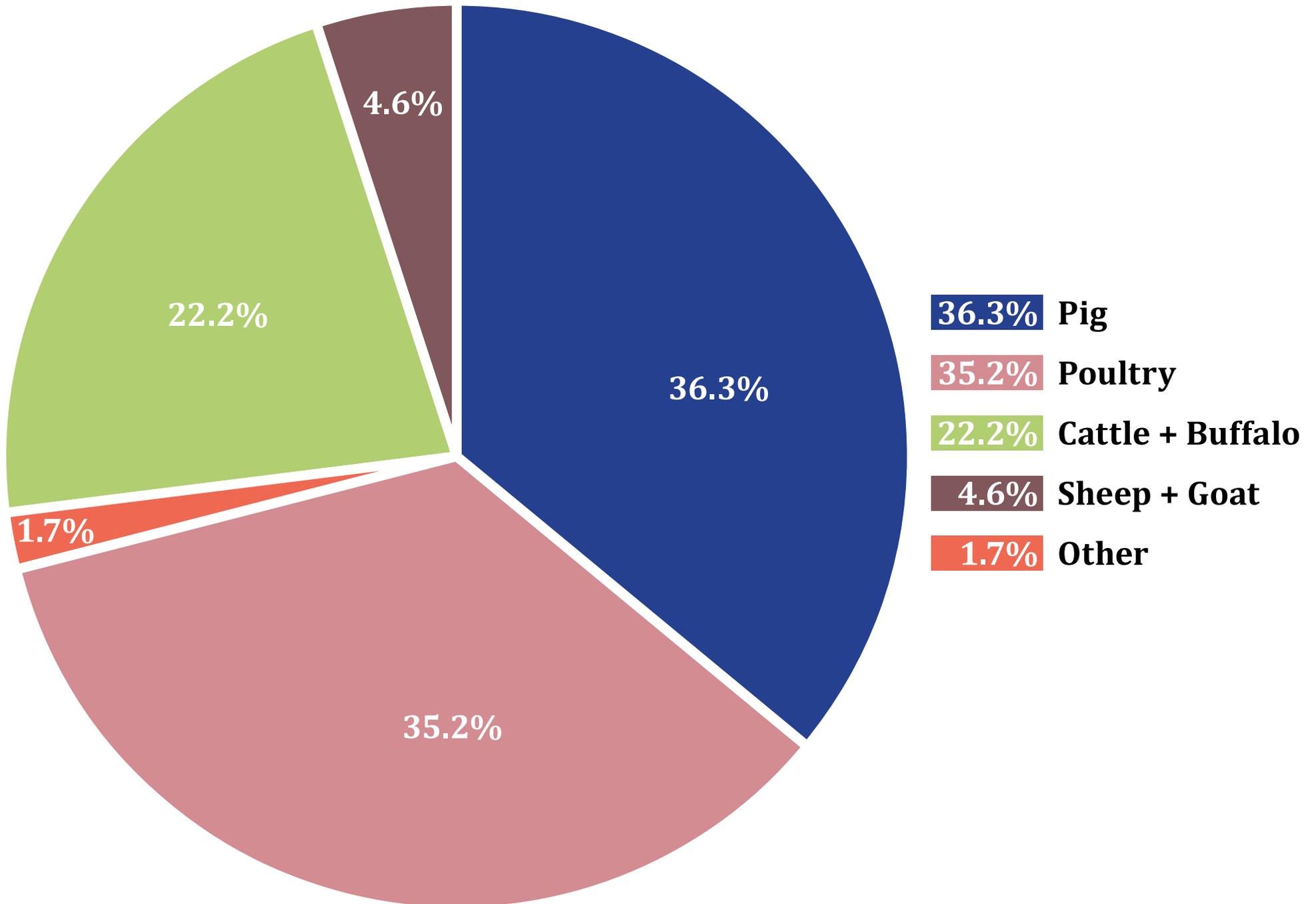
T3.9-12.c Describe the nutritional value that can be added by processing foods.

T3.9-12.f Explain how food production systems are influenced by consumer choices.

Science, Technology, Engineering & Mathematics

T4.9-12.g Provide examples of how processing adds value to agricultural goods and fosters economic growth both locally and globally.

Sources of the World's Meat Supply in 2012



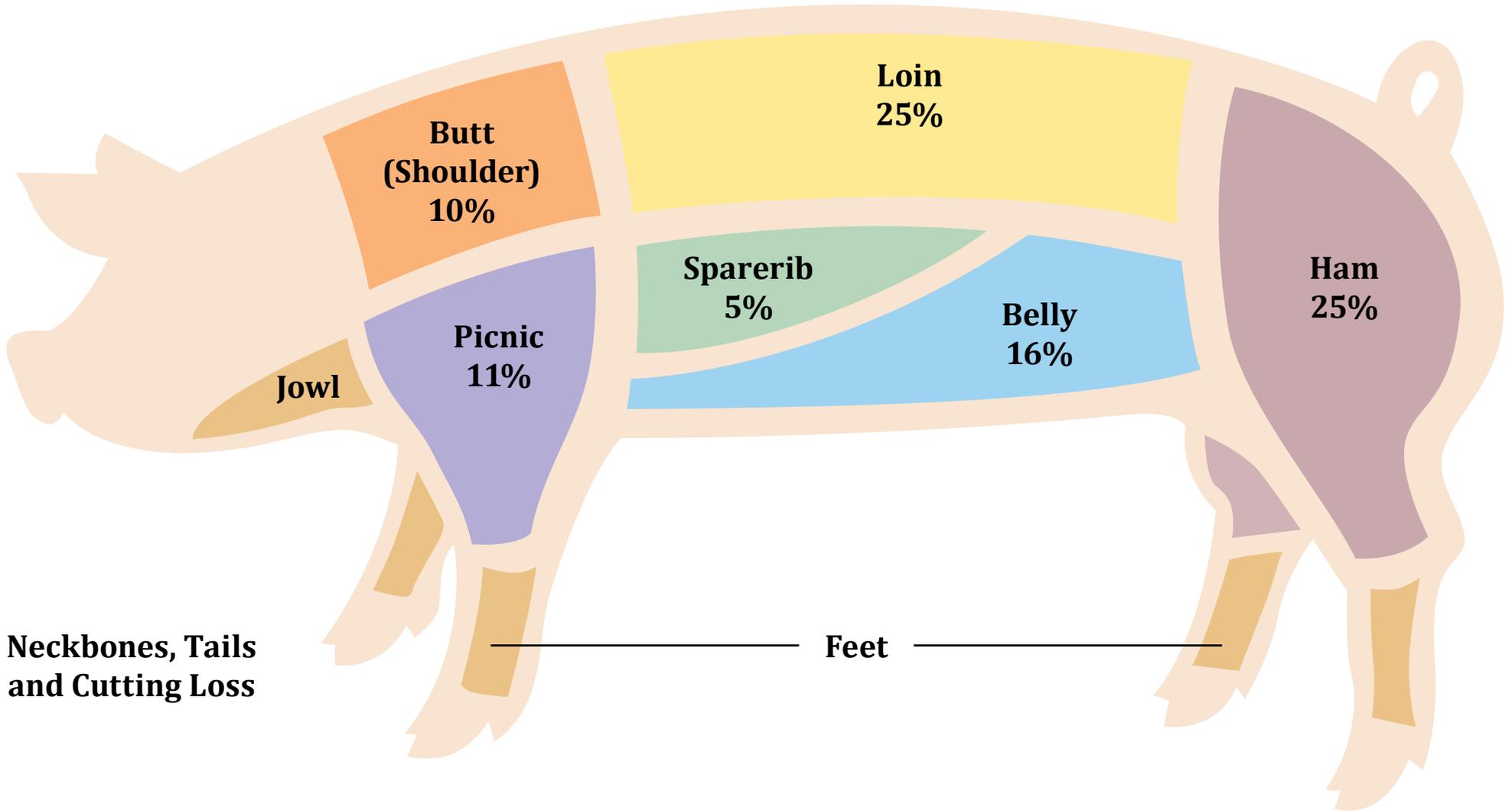
Name: _____

Period: _____

Date: _____

Due: _____

Pork Wholesale Diagram



Pork Wholesale Diagram - Key

Pepperoni
(Jowl)



Pork Tenderloin
(Loin)



Arm Roast
(Picnic)



Contry-Style Ribs
(Sparerib)



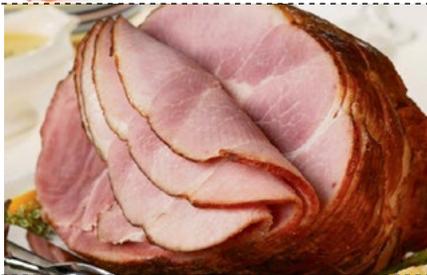
Bacon
(Belly)



Pork Belly Burnt Ends
(Belly)



Ham
(Ham)



Sausage
(Jowl, various other cuts)



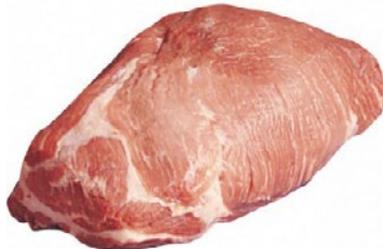
New York Pork Chop
(Loin)



Shoulder Steak, Bone In
(Butt)



Blade Boston Roast
(Butt)



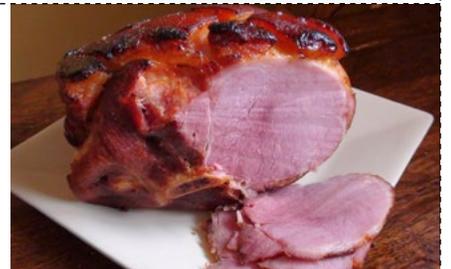
Smoked Center Slice
(Ham)



Spareribs
(Sparerib)



Smoked Picnic
(Picnic)



Pork Wholesale Diagram

Pepperoni



Pork Tenderloin



Arm Roast



Contry-Style Ribs



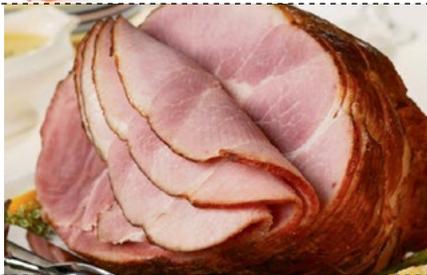
Bacon



Pork Belly Burnt Ends



Ham



Sausage



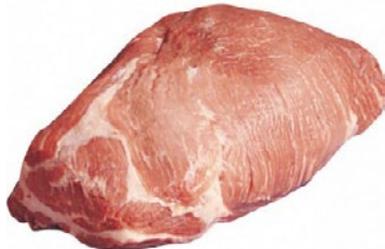
New York Pork Chop



Shoulder Steak, Bone In



Blade Boston Roast



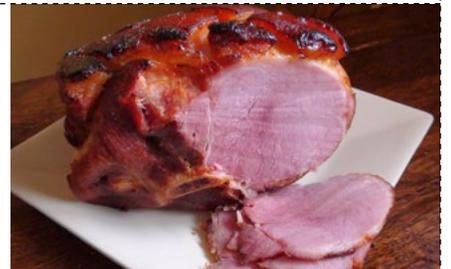
Smoked Center Slice



Spareribs



Smoked Picnic



Name: _____ Period: _____ Date: _____ Due: _____

KNOW THE NUTRIENTS IN PORK WORKSHEET

Instructions: Use the "Know the Nutrients in Pork" handout to answer the following questions as completely as possible.

1. What is the importance of protein in our diets? At what stages of life is protein especially critical?

2. Summarize **one** of 9 key nutrients pork provides. What is its role within the body?

3. How does pork compare to chicken? Compare a specific cut nutritionally. Does this surprise you?

4. What is something new you didn't know about pork prior to reading the article?

5. Utilizing the article, create a "Privy to Pork," fact. The fact should summarize a key point from the article related to the nutrition of pork, but should not be verbatim what the article said.

6 - 14. Match the pork nutrient with the specific benefit it provides.

6. _____ Potassium

9. _____ Selenium

12. _____ Phosphorous

7. _____ Riboflavin

10. _____ Niacin

13. _____ Zinc

8. _____ Thiamin

11. _____ Vitamin B6

14. _____ Protein

- a. Helps nerve impulses maintain a steady heartbeat.
- b. Macronutrient that provides building block for bone, muscles, skin, and blood.
- c. Important for brain development during pregnancy and infancy. Type of B vitamin
- d. Helps convert food into energy. Essential for healthy skin, blood cells, brain and nervous system.
- e. Trace mineral found in all body cells. Needed to make protein and DNA. Also helps immune system fight off bacteria.
- f. Mineral that helps build and protect strong bones and teeth.
- g. Helps convert food into energy and critical for growth and development of body cells.
- h. Helps protect body cells from damage.
- i. B vitamin that is important in maintaining normal vision and in preventing cataracts.

PORK NUTRIENTS WORKSHEET

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Answers will vary:

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Important for growth and development. Key component to help the body repair cells and make new cells. Plays a role in the immune system and in making enzymes, hormones and other body chemicals.

Selenium: Mineral/Trace Element. Helps protect the body cells from damage. Plays a role in regulating thyroid hormone metabolism.

Niacin: B Vitamin. Helps convert food into energy. Essential for healthy skin, blood cells, brain and nervous system. Helps maintain a healthy cardiovascular system.

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13. E Zinc

8. G Thiamin

11. C Vitamin B6

14. B Protein

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Know the Nutrients in Pork



Have You Met the “New” Pork?

If you think you know pork, think again. Seven cuts of pork – from tenderloin to a ribeye pork chop – meet the USDA guidelines for lean. In fact, pork tenderloin is just as lean as a skinless chicken breast, and many cuts of pork from the loin are leaner than a skinless chicken thigh. Surprised? We thought you might be.

Seven common cuts of pork are, on average, 16% leaner than 20 years ago.

The pork industry has responded to the consumer’s desire for lean pork products. Through efforts in feeding and management practices by pork farmers, seven of the most common cuts of pork have, on average, 16% less fat and 27% less saturated fat than 20 years ago.

Looking for Lean? Think “Loin” and “Chop”

One of the easiest ways to remember lean cuts of pork is to look for the word “loin” in the name, such as pork tenderloin. Any kind of pork chop is also a lean choice, from sirloin chop to porterhouse chop.

Packed with Protein

High-quality protein provides all of the essential amino acids needed by the body for growth and maintenance. Your body can’t make essential amino acids, so you must get them from the foods you eat. Pork is a high-quality protein food.

Research suggests that evenly distributing protein at meals and snacks throughout the day – about 20 to 30 grams per eating occasion, depending on your individual protein needs – may benefit health.

During stages of life when growth and development needs are high, such as during childhood, adolescence and pregnancy, eating animal foods such as pork will provide both greater quantity and quality of protein than the protein found in plant foods. Getting enough protein is important for adults, too. A growing body of research shows that eating a moderate

amount of protein, combined with physical activity, is key to help lower risk of sarcopenia. Sarcopenia is the gradual loss of muscle mass and function that begins in middle age and can lead to frailty, increased risk of falls and difficulty doing everyday tasks as we get older.

Need another reason to include adequate protein in your diet? Studies have shown that higher protein diets – including those with lean meats such as lean pork cuts – can help with both weight loss and ongoing weight maintenance by reducing overall calorie intake and increasing the amount of calories used. Research has also shown that when people who were obese and overweight switched to a high-protein diet with 25 percent of total calories coming from lean pork and other proteins, they reported an increased feeling of fullness throughout the day.

Pork’s Slim 7

1.02g Saturated Fat 2.98g Total Fat

Pork tenderloin

0.86g Saturated Fat 3.03g Total Fat

Skinless chicken breast

1.15g Saturated Fat 3.71g Total Fat

Sirloin pork chop

1.77g Saturated Fat 5.17g Total Fat

New York pork chop (boneless top loin pork chop)

1.77g Saturated Fat 5.27g Total Fat

Ground pork, 96% lean

1.64g Saturated Fat 5.34g Total Fat

New York pork roast (boneless top loin pork roast)

1.83g Saturated Fat 6.20g Total Fat

Porterhouse chop (bone-in center pork chop)

2.17g Saturated Fat 7.10g Total Fat

Ribeye pork chop (bone-in rib pork chop)

2.58g Saturated Fat 9.25g Total Fat

Skinless chicken thigh

Pork tenderloin is just as lean as a skinless chicken breast!



Legend: Saturated Fat (light blue), Total Fat (dark brown)

Based on 3-ounce cooked servings (roasted or broiled), visible fat and skin trimmed after cooking.

Reference: U.S. Department of Agriculture, Agriculture Research Service, 2012.

Lean: Less than 10 grams total fat, 4.5 grams saturated fat and 95 milligrams cholesterol per serving.

Extra Lean: Less than 5 grams total fat, 2 grams saturated fat and 95 milligrams cholesterol per serving.



Pork Provides 9 Key Nutrients

Pork is a nutrient-rich food. A 3-ounce serving of pork is a good source of potassium, riboflavin and zinc, and is an excellent source of vitamin B6, thiamin, phosphorus, niacin and protein. Pork is naturally low in sodium, too.

Pork Nutrient	Benefit
Protein	Macronutrient. Provides essential amino acids. Building block for bone, muscles, skin and blood. Important for growth and development. Key component to help the body repair cells and make new cells. Plays a role in the immune system and in making enzymes, hormones and other body chemicals.
Selenium	Mineral/Trace Element. Helps protect the body cells from damage. Plays a role in regulating thyroid hormone metabolism.
Niacin	B Vitamin. Helps convert food into energy. Essential for healthy skin, blood cells, brain and nervous system. Helps maintain a healthy cardiovascular system.
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Potassium	Mineral. Balances body fluids and is needed for muscle contractions. Helps send nerve impulses and maintain a steady heartbeat. May help lower blood pressure.

Five-Spice Pork and Apple Salad

10 minutes prep | 20 minutes cook | Serves 4

- 1 pound pork tenderloin
- 2 teaspoons Chinese five-spice, divided*
- ¼ teaspoon salt and black pepper
- 1 Fuji apple, OR other sweet-tart apple
- ¼ red onion
- 3 tablespoons seasoned rice vinegar
- 2 tablespoons canola oil OR other neutral-flavored oil
- 12 cups mixed greens, (about 6 ounces)

Preheat oven to 425 degrees F.

Season tenderloin on all sides with 1½ teaspoons Chinese five-spice powder, salt and pepper. Place tenderloin in shallow pan and roast for about 20 minutes, or until internal temperature reaches 145 degrees F. Remove pork from oven and let rest 5 minutes. While pork is cooking, core and thinly slice apple. Thinly slice onion.

While pork is resting, in a large bowl, whisk together vinegar, oil and remaining ½ teaspoon Chinese five-spice powder. Add salad greens, apple and onion and toss. Season with salt and pepper to taste if desired. Arrange salad on plates or a platter.

Cut pork into thin slices. Arrange on top of salads and serve.

*Note: Chinese five-spice powder is a spice blend available in either the spice section or the Asian or ethnic food section of most major supermarkets. Five-spice powder is a mixture of five spices encompassing all five flavors of sweet, sour, bitter, pungent and salty.



Nutrition:

Calories: 220 calories
 Protein: 25 grams
 Fat: 10 grams
 Sodium: 215 milligrams
 Cholesterol: 75 milligrams
 Saturated Fat: 1.5 grams
 Carbohydrates: 9 grams
 Fiber: 2 grams

Visit PorkBeInspired.com for more nutritious and delicious pork recipes.