4-H Animal Science Lesson Plan
Quality Assurance
Level 1, 2

Animal By-Products

Rikki Ruiz, Extension Educator

Goal (learning objective)
Youth will identify products they use in daily life that contain animal by-products.

Supplies
- Copies of Handouts 1-3 (as a packet, enough for group)
  - Handout 1 - “Sheep By-Products Worksheet”
  - Handout 2 - “Cow By-Products Worksheet”
  - Handout 3 - “Pig By-Products Worksheet”
- Copies of Handouts 4-6 (as a packet, enough for group)
  - Handout 4 - “By-Products from Sheep”
  - Handout 5 - “By-Products from Cows”
  - Handout 6 - “By-Products from Pigs”
- Copies of Handouts 7-9 (1 copy for you)
  - Handout 7 - “Sheep By-Products Worksheet Answer Key”
  - Handout 8 - “Cow By-Products Worksheet Answer Key”
  - Handout 9 - “Pig By-Products Worksheet Answer Key”
- Pencils - enough for group

Pre-lesson preparation
- Make photocopies of the handouts above.
- Read/review the handouts and terminology.

Lesson directions and outline
Share the following information with the youth:

Livestock by-products are a part of many manufactured items that we use daily. Utilizing by-products enables us to use 99% of every animal. There are animal by-products in toothpaste, baseball equipment, clothing, items in your medicine cabinet, paint brushes and more.

Conducting the activity (DO)
1. As a warm up, brainstorm with the group by-products that come from sheep, cows and pigs.
2. Have a volunteer distribute to each member a packet of Handouts 1-3.
3. Provide 10-15 minutes for members to work through the packet. Remember, they are working from the worksheet first so be prepared for questions, have them answer it to the best of their ability.
4. Once the group has completed the packet to the best of their ability, distribute the packet of Handouts 4-6.
5. Go through Handouts 1-3, reference your answer key (Handouts 7-9).
6. Ask: Were there any surprises as you worked through the worksheet?
7. Ask: Did anyone get all of the questions right for species that you don't work with?
8. Ask: Are there any similar by-products among the species?
What did we learn? (REFLECT)
- Ask: Why is it important to be knowledgeable about by-products?
- Ask: Are there any items that you use regularly that you didn’t know were a by-product?

Why is that important? (APPLY)
- Ask: Why are by-products important?
- Ask: How are consumers impacted by by-products?
- Ask: How do by-products impact your decisions as a producer?

Resources


Ohio State University Extension. (2000). Pork Products. Swine resource handbook for market and breeding projects (pages 5-1 through 5-8).
True or False?
Do the products listed below come from sheep? Write true next to the products you think come from sheep and false after the ones that you don’t think come from sheep.

Products

1. Surgical sutures
2. Fabrics
3. Rack of lamb
4. Nitrogen fertilizer
5. Chewing gum
6. Clothing
7. Solvents

Parts of the Sheep

a. Intestines
b. Hide and Wool
c. Retail Meats
d. Manure
e. Fats and Fatty Acids
Everything But the Mooo.....
Cow By-Products Worksheet

Name: ________________________________

True or False?
Do the products listed below come from cows? Write true next to the products you think come from cows and false after the ones that you don’t think come from cows.


Matching
Match the product on the left to the part of the cow that you think it came from on the right. You may use the parts of the cow more than once. Some parts may not be used.

<table>
<thead>
<tr>
<th>Products</th>
<th>Parts of the Cow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pasta</td>
<td>a. Brain</td>
</tr>
<tr>
<td>2. Candles</td>
<td>b. Blood</td>
</tr>
<tr>
<td>3. Sheet rock</td>
<td>c. Hooves/Horns</td>
</tr>
<tr>
<td>4. Phosphorus</td>
<td>d. Internal Organs</td>
</tr>
<tr>
<td>5. Chewing gum</td>
<td>e. Fat</td>
</tr>
<tr>
<td>6. Refined sugar</td>
<td>f. Milk</td>
</tr>
<tr>
<td>7. Shampoo</td>
<td>g. Manure</td>
</tr>
<tr>
<td>8. Dyes &amp; inks</td>
<td>h. Skin</td>
</tr>
<tr>
<td>9. Air filters</td>
<td>i. Hair</td>
</tr>
<tr>
<td>10. Hormones</td>
<td>j. Bones</td>
</tr>
</tbody>
</table>
True or False?
Do the products listed below come from pigs? Write true next to the products you think come from pigs and false after the ones that you don’t think come from pigs.


Label
Using the word bank below, label the missing parts of the pig. Not all words will be used.

Ham
Hock
Foot
Dewclaw
Hip
Loin
Flank
Shoulder
Jowl
Jaw
Head
Underline
Neck
Knee
Pastern

Diagram of a pig with parts labeled.
Everything But the Baaaa......
By-Products from Sheep

From Hide and Wool...
- Lanolin
- Clothing
- Drum heads
- Luggage
- Yarns
- Artists’ brushes
- Sports equipment
- Fabrics
- Rouge base
- Insulation
- Rug pads
- Asphalt binder
- Textiles
- Ointment base
- Tennis balls
- Worsted fabric
- Felt
- Carpet
- Footwear
- Woolen goods
- Baseballs
- Upholstry
- Hide glue
- Paint & plaster binder

From Fats and Fatty Acids...
- Explosives
- Solvents
- Chewing Gum
- Paints

From Manure...
- Nitrogen fertilizer
- Potash
- Phosphorus
- Minor minerals

From Intestines...
- Sausage casings
- Instrument strings
- Surgical sutures
- Tennis racquet strings

And Of Course the Retail Meats....
- Leg of Lamb
- Lamb shoulder roasts
- Lamb chops
- Rack of lamb
- Lamb riblets and spareribs
- Lamb burgers
- Lamb kabobs
- Lamb shanks

so many products come from sheep
that we really do use everthing but
the baaa!
Everything But the Moooo......

By-Products from Cows

**From Brain...**
- Anti-aging cream medicines

**From Blood...**
- Pasta
- Cake mixes
- Dyes & inks
- Adhesives
- Minerals
- Medicines
- Laboratory research materials

**From Bones...**
- Refined sugar
- Charcoal
- Fertilizer
- Glass

**From Hair...**
- Air filters
- Brushes
- Felt
- Insulation
- Plaster
- Textiles

**From Manure...**
- Fertilizer
- Nitrogen
- Phosphorus

**From Internal Organs...**
- Instrument strings
- Tennis racquet strings
- Hormones, enzymes, vitamins & other medical material

**From Fat...**
- Chewing gum
- Candles
- Detergents
- Fabric softner
- Deodorant
- Shaving cream
- Perfume
- Pet food
- Cosmetics
- Creams & lotions
- Crayons
- Paint
- Oil & lubricants
- Biodiesel
- Plastics
- Waterproofing agents
- Cement
- Ceramics
- Chalk
- Explosives
- Fireworks
- Matches
- Fertilizer
- Antifreeze
- Insulation
- Linoleum
- Rubber
- Textiles
- Medicines

**From Hooves and Horns...**
- Adhesives
- Plastics
- Pet food
- Plant food
- Photo film
- Shampoo & conditioner
- Emery boards
- Lamination
- Wallpaper
- Plywood

**From Milk...**
- Adhesives
- Plastics
- Cosmetics
- Medicines

**From Skin...**
- Gelatin
- Flavorings
- Emery boards
- Sheet rock
- Wallpaper
- Adhesives
- Medicines
- Candies & confectionary

so many products come from cows that we really do use everything but the mooo!
Everything But the Oink.....
By-Products from Pigs

From Blood...
- Medicines
- Sticking agent
- Leather treating agent
- Plywood Adhesive
- Protein source in feeds
- Fabric printing and dyeing

From Brain...
- Cholesterol
- Other medicines

From Hair...
- Artist's brushes
- Insulation
- Upholstery

From Internal Organs...
- Insulin
- A variety of medicines
- Surgical sutures
- Heart valves

From Skin...
- Gelatin
- Footballs
- Porcine Burn Dressings
- Luggage, purses
- Gloves and shoes
- Pigskin garments
- Drumheads

From Fatty Acids and Glycerine...
- Insecticides
- Weed killers
- Lubricants
- Oil polishes
- Rubber
- Cosmetics
- Antifreeze
- Nitroglycerine
- Plastics
- Plasticizers
- Printing rollers
- Cellophane
- Floor waxes
- Cement
- Waterproofing agents
- Fiber softeners
- Crayons
- Chalk
- Phonograph records
- Matches
- Putty
- Insulation
- Linoleum

From Bones...
- Glue
- Buttons
- Bone China
- Bone Meal
- Minerals for feed
- Fertilizer
- Porcelain enamel
- Glass
- Water filters

From Meat Scraps...
- Commercial feeds
- Pet food

AND OF COURSE: bacon, ham, sausage, pork chops, ribs, BBQ and more!

so many products come from pigs that we really do use everything but the oink!
**Everything But the Baaaa…..**

Sheep By-Products Worksheet

**True or False?**

Do the products listed below come from sheep? Write true next to the products you think come from sheep and false after the ones that you don’t think come from sheep.

<table>
<thead>
<tr>
<th>Products</th>
<th>True or False</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rack of lamb</td>
<td><em><strong>c</strong></em></td>
</tr>
<tr>
<td>2. Surgical sutures</td>
<td><em><strong>a</strong></em></td>
</tr>
<tr>
<td>3. Peanut butter</td>
<td><em><strong>b</strong></em></td>
</tr>
<tr>
<td>4. Yarn</td>
<td><em><strong>e</strong></em></td>
</tr>
<tr>
<td>5. Baseballs</td>
<td><em><strong>b</strong></em></td>
</tr>
<tr>
<td>6. Paper</td>
<td><em><strong>e</strong></em></td>
</tr>
<tr>
<td>7. Paints</td>
<td><em><strong>d</strong></em></td>
</tr>
</tbody>
</table>

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**Parts of the Sheep**

|                               |          |
|                               |          |
| a. Intestines                 |          |
| b. Hide and Wool              |          |
| c. Retail Meats               |          |
| d. Manure                     |          |
| e. Fats and Fatty Acids       |          |

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**Matching**

Match the product on the left to the part of the sheep that you think it came from on the right. You may use the parts of the sheep more than once.

<table>
<thead>
<tr>
<th>Products</th>
<th>Parts of the Sheep</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lanolin</td>
<td>a. Intestines</td>
</tr>
<tr>
<td>2. Lamb chops</td>
<td>b. Hide and Wool</td>
</tr>
<tr>
<td>3. Peanut butter</td>
<td>c. Retail Meats</td>
</tr>
<tr>
<td>4. Yarn</td>
<td>d. Manure</td>
</tr>
<tr>
<td>5. Baseballs</td>
<td>e. Fats and Fatty Acids</td>
</tr>
<tr>
<td>6. Paper</td>
<td></td>
</tr>
<tr>
<td>7. Paints</td>
<td></td>
</tr>
<tr>
<td>8. Lumber</td>
<td></td>
</tr>
<tr>
<td>9. Concrete</td>
<td></td>
</tr>
<tr>
<td>10. Tennis balls</td>
<td></td>
</tr>
<tr>
<td>11. Instrument strings</td>
<td></td>
</tr>
<tr>
<td>12. Leg of Lamb</td>
<td></td>
</tr>
<tr>
<td>13. Artists’ brushes</td>
<td></td>
</tr>
<tr>
<td>14. Drum heads</td>
<td></td>
</tr>
</tbody>
</table>

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Name: ____________________________

Answer Key

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True

1. Lanolin
2. Lamb chops
3. Peanut butter
4. Yarn
5. Baseballs
6. Paper
7. Paints

False

8. Lumber
9. Concrete
10. Tennis balls
11. Instrument strings
12. Leg of Lamb
13. Artists’ brushes
14. Drum heads

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**QUALITY ASSURANCE: ANIMAL BY-PRODUCTS - HANDOUT 7**
Everything But the Mooo.....
Cow By-Products Worksheet

True or False?
Do the products listed below come from cows? Write true next to the products you think come from cows and false after the ones that you don’t think come from cows.

Products
___b___ 1. Pasta
___e___ 2. Candles
___h___ 3. Sheet rock
___g___ 4. Phosphorus
___e___ 5. Chewing gum
___j___ 6. Refined sugar
___c___ 7. Shampoo
___b___ 8. Dyes & inks
___i___ 9. Air filters
___d___ 10. Hormones

Parts of the Cow
a. Brain
b. Blood
c. Hooves/Horns
d. Internal Organs
e. Fat
f. Milk
g. Manure
h. Skin
i. Hair
j. Bones

Matching
Match the product on the left to the part of the cows that you think it came from on the right. You may use the parts of the cows more than once.

Name: ____________________________

Products
___b___ 1. Medicine
___e___ 2. Anti-aging cream
___h___ 3. Sheet rock
___g___ 4. Felt
___e___ 5. Chewing gum
___j___ 6. Paper
___c___ 7. Cosmetics
___b___ 8. Solid wood fence boards
___g___ 9. Salt
___b___ 10. Deodorant
___h___ 11. Instrument strings
___e___ 12. Fertilizer
___h___ 13. Plastics
___d___ 14. Rubber

Answer Key
True True True True True False False False False False

QUALITY ASSURANCE: ANIMAL BY-PRODUCTS - HANDOUT 8
True or False?

Do the products listed below come from pigs? Write true next to the products you think come from pigs and false after the ones that you don’t think come from pigs.

Name: ____________________

1. Footballs
2. Bacon
3. Carrots
4. Insecticides
5. Heart Valves
6. Paper
7. Crayons
8. Lumber
9. Yarn
10. Bone China
11. Insulin
12. Pork Chops
13. Artists’ brushes
14. Drum heads

Label

Using the word bank below, label the missing parts of the pig. Not all words will be used.

Ham
Hock
Foot
Dewclaw
Hip

Loin
Flank
Shoulder
Jowl
Jaw

Head
Underline
Neck
Knee
Pastern