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 are by-products important?
- Ask: Why do we need 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: What are some specific ways consumers would be impacted, if by-products were not available?
- Ask: How might your understanding of by-products impact your decisions as a producer?
- Ask: What are some other settings where by-products are generated and put to good use?

Resources


Ohio State University Extension. (2000). Pork Products. Swine resource handbook for market and breeding projects (pages 5-1 through 5-8).
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. Surgical sutures</td>
<td>False</td>
</tr>
<tr>
<td>2. Fabrics</td>
<td>False</td>
</tr>
<tr>
<td>3. Rack of lamb</td>
<td>False</td>
</tr>
<tr>
<td>4. Nitrogen fertilizer</td>
<td>False</td>
</tr>
<tr>
<td>5. Chewing gum</td>
<td>False</td>
</tr>
<tr>
<td>6. Clothing</td>
<td>False</td>
</tr>
<tr>
<td>7. Solvents</td>
<td>False</td>
</tr>
<tr>
<td>8. Lumber</td>
<td>True</td>
</tr>
<tr>
<td>9. Concrete</td>
<td>False</td>
</tr>
<tr>
<td>10. Tennis balls</td>
<td>False</td>
</tr>
<tr>
<td>11. Instrument strings</td>
<td>False</td>
</tr>
<tr>
<td>12. Leg of Lamb</td>
<td>True</td>
</tr>
<tr>
<td>13. Artists’ brushes</td>
<td>False</td>
</tr>
<tr>
<td>14. Drum heads</td>
<td>False</td>
</tr>
</tbody>
</table>

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>
Everything But the Moooc.....

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.

__________ 1. Medicine
__________ 2. Anti-aging cream
__________ 3. Mashed potatoes
__________ 4. Felt
__________ 5. Chewing gum
__________ 6. Paper
__________ 7. Cosmetics

__________ 8. Solid wood fence boards
__________ 9. Salt
__________ 10. Deodorant
__________ 11. Instrument strings
__________ 12. Fertilizer
__________ 13. Plastics
__________ 14. Rubber

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.

Products
_____ 1. Pasta
_____ 2. Candles
_____ 3. Sheet rock
_____ 4. Phosphorus
_____ 5. Chewing gum
_____ 6. Refined sugar
_____ 7. Shampoo
_____ 8. Dyes & inks
_____ 9. Air filters
_____ 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
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.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Footballs</td>
<td></td>
<td>8.</td>
<td>Lumber</td>
</tr>
<tr>
<td>2.</td>
<td>Bacon</td>
<td></td>
<td>9.</td>
<td>Yarn</td>
</tr>
<tr>
<td>3.</td>
<td>Carrots</td>
<td></td>
<td>10.</td>
<td>Bone China</td>
</tr>
<tr>
<td>4.</td>
<td>Insecticides</td>
<td></td>
<td>11.</td>
<td>Insulin</td>
</tr>
<tr>
<td>5.</td>
<td>Heart Valves</td>
<td></td>
<td>12.</td>
<td>Pork Chops</td>
</tr>
</tbody>
</table>

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
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
- Baseballs
- Upholstery
- 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 everything 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 everthing 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 Bones...
- Glue
- Buttons
- Bone China
- Bone Meal
- Minerals for feed
- Fertilizer
- Porcelain enamel
- Glass
- Water filters

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 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 everthing but the oink!
Everything But the Baaaa......
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<td>9. Concrete</td>
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<td>d. Manure</td>
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<td>5. Clothing</td>
<td></td>
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<td>6. Solvents</td>
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<td></td>
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</tr>
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<tr>
<td><em><strong>True</strong></em></td>
<td>1.</td>
<td>Medicine</td>
<td><em><strong>False</strong></em></td>
<td>8.</td>
</tr>
<tr>
<td><em><strong>True</strong></em></td>
<td>2.</td>
<td>Anti-aging cream</td>
<td><em><strong>False</strong></em></td>
<td>9.</td>
</tr>
<tr>
<td><em><strong>False</strong></em></td>
<td>3.</td>
<td>Mashed potatoes</td>
<td><em><strong>True</strong></em></td>
<td>10.</td>
</tr>
<tr>
<td><em><strong>True</strong></em></td>
<td>4.</td>
<td>Felt</td>
<td><em><strong>True</strong></em></td>
<td>11.</td>
</tr>
<tr>
<td><em><strong>True</strong></em></td>
<td>5.</td>
<td>Chewing gum</td>
<td><em><strong>True</strong></em></td>
<td>12.</td>
</tr>
<tr>
<td><em><strong>False</strong></em></td>
<td>6.</td>
<td>Paper</td>
<td><em><strong>True</strong></em></td>
<td>13.</td>
</tr>
<tr>
<td><em><strong>True</strong></em></td>
<td>7.</td>
<td>Cosmetics</td>
<td><em><strong>True</strong></em></td>
<td>14.</td>
</tr>
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</table>

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.

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<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em><strong>b</strong></em></td>
<td>1. Pasta</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em><strong>e</strong></em></td>
<td>2. Candles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em><strong>h</strong></em></td>
<td>3. Sheet rock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em><strong>g</strong></em></td>
<td>4. Phosphorus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em><strong>e</strong></em></td>
<td>5. Chewing gum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em><strong>j</strong></em></td>
<td>6. Refined sugar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em><strong>c</strong></em></td>
<td>7. Shampoo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em><strong>b</strong></em></td>
<td>8. Dyes &amp; inks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em><strong>i</strong></em></td>
<td>9. Air filters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em><strong>d</strong></em></td>
<td>10. Hormones</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parts of the Cow</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Brain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Blood</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Hooves/Horns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Internal Organs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Fat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Manure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Skin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Hair</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. Bones</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Everything But the Oink.....

Pig By-Products Worksheet

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.

<table>
<thead>
<tr>
<th>Name</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
<th>13.</th>
<th>14.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>True</td>
<td>False</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>True</td>
<td>True</td>
<td>True</td>
<td>True</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>True</td>
<td></td>
</tr>
</tbody>
</table>

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

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