



Lessons presented by
Oklahoma State University
 Ferguson Family Dairy Visitor Center
 With Southwest-Southland Dairy Farmers

Instructor	Jaycie Heath
Grade Level	3-5
Lesson Title	Dairy Byproducts (Scheduled In Person)

TEACHER PREPARATION

Learning Goals & Standards/Performance Indicators	
Learning Goals	Standards
1. Upon completion of this lesson students will be able to understand that dairy products extend beyond milk, cheese, ice cream, etc.	1. <u>SS: 3.4</u> The student will identify and describe basic economic activities creating prosperity in the state of Oklahoma. 2. <u>SS: 3.4.3</u> Examine how the development of Oklahoma’s major economic activities have contributed to the growth of the state, including, mining and energy industry, agriculture, aviation, tourism, tribal enterprises, and military installations. 3. <u>WG.5</u> The student will analyze agricultural and commercial land use.
Resources and Materials	
<input type="checkbox"/> Iowa State Byproducts Bingo <input type="checkbox"/> By-products of dairy industry <input type="checkbox"/> Products with Hidden Dairy <input type="checkbox"/> Casein in Health <input type="checkbox"/> Surprising Foods that Contain Milk <input type="checkbox"/> Southwest Southland Dairy Farmers- The Dairy Industry: Protecting Our Environment and Future <input type="checkbox"/> Visuals in the center <input type="checkbox"/> Student tour guides	
Announcement and Other Preliminaries	
1. Welcome students to the Ferguson Family Dairy, introduce self and what you do for the dairy, etc.	

LESSON DELIVERY

Anticipatory Set

- Has anyone had any dairy products today? (Milk in their cereal, ice cream, yogurt, etc.)
- What are some other dairy products that you know of?
 - Take a few answers, make sure they understand that dairy products are produced from milk and dairy cows.
- Did you know that there are a lot of things that use byproducts of dairy in them?

Today we are going to learn about the surprising products that have dairy in them.

Direct Instruction

1st Learning Goal: Upon completion of this lesson students will be able to understand that dairy products extend beyond milk, cheese, ice cream, etc.

Content Outline	Instructional Strategies
<p><u>What is a Byproduct?</u></p> <ul style="list-style-type: none"> • A byproduct is a secondary, or unintentional, product made during the processing or production of another product. <p><u>What are the Main Dairy Byproducts?</u></p> <ul style="list-style-type: none"> • When we are processing milk, we end up with a few main byproducts: <ul style="list-style-type: none"> ○ Casein- a protein found in milk that contains amino acids. ○ Whey- a dilute, highly perishable greenish yellow fluid and the largest by-product of the dairy world <p><u>Casein</u></p> <ul style="list-style-type: none"> • Casein has a variety of uses including: • Cheese making • paper, textile, paint, leather, rubber production • Special “high-clarity” casein has been used to manufacture television screens. • Canned tuna– Several brands of canned tuna have casein in them to enhance flavor. • Baby formula- its proteins and amino acids make it a nutritional addition. • Protein supplements are often casein based or have casein as a primary ingredient. • Some chewing gums even used protein from casein (trident is one example) <p><u>Whey</u></p>	<ul style="list-style-type: none"> • Provide students with images of byproducts or even the real thing to allow them to better understand how varied the use of dairy byproducts is.

1st Learning Goal: Upon completion of this lesson students will be able to understand that dairy products extend beyond milk, cheese, ice cream, etc.

- Whey was formerly a waste product during the manufacture of cheese but is now used for:
- Cheese whey accounts for nearly 95% of total whey
- Candy, baby food, baked goods, lactic acid (an ingredient in cake mixes), and cosmetics (makeup).
- Dried whey and whey products are often utilized in animal feeds.
- Whey protein based infant formulas and other nutritional products that require lactose
- Medications and vitamins sometimes contain whey.
- Cheese whey proteins are used to make clear film packaging materials.
- Whey and lactose are even used to make specialty adhesives and paper coatings.

Learning Activity

- Students should be provided with a paper of images (some byproducts of dairy production, others that aren't), at the conclusion of the presentation they should write/color/circle which images are byproducts and be encouraged to list if they utilize whey or casein.

Assessment

- Questions similar to the following should be asked:
 - What is whey?
 - What is casein?
 - What is one product you learned about that you didn't know was a dairy byproduct before today?

Closure

Closing Announcements/Reminders

- Answer any questions they may have.
- Show them the robot and viewing windows one more time.
- Thank students for coming to the Ferguson Family Dairy