# The Book Planter

FARM BUREAU NORTH CAROLINA

Ag in the Classroom

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***Extra Cheese, Please! Mozzarella's Journey From Cow to Pizza***

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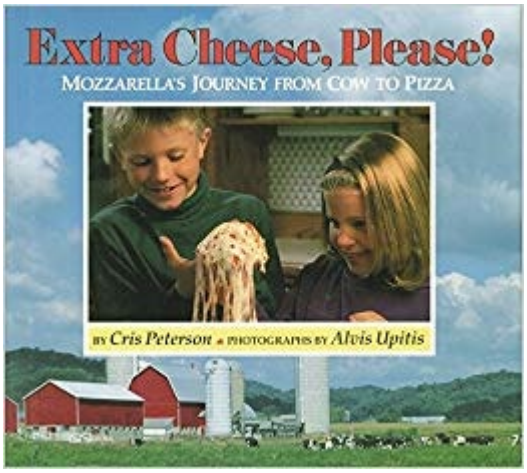



When Annabelle the cow gives birth to her calf, she also begins to produce milk. The milk is then processed into cheese, and from the cheese, pizza is made. Cris Peterson's book gives the reader a look at milk production—from cow and calf on the farm, to transport and production, where curds start to form. Understanding how complex the cheese-making process is will help you appreciate that delicious food you love so much: cheese!

**Fun Facts**

- In the past, a person could take up to 1 hour to milk 6 cows by hand. Today, a person can milk 100 or more cows per hour using modern machines and technology.[1]
- Before modern milk delivery, when people traveled and wanted milk, they had to take their cows with them.[1]
- The U.S. dairy industry conducts more than 3.5 million tests each year to certify the milk we drink is safe and wholesome.[1]
- Most of North Carolina's cheese makers use goat or cow milk, or a combination of both, to make their cheeses.[2]
- The NC Cheese Trail (a cheese collective, see website in **Links**) holds cheese festivals in the spring and fall.[2]
- What does the term artisan or artisanal mean when it comes to cheese? The word "artisan" or "artisanal" implies that a cheese is produced primarily by hand, in small batches, with particular attention paid to the tradition of the cheese maker's art, and thus using as little mechanization as possible in the production of the cheese.[3]
- Farmstead cheese is cheese made on the same farm where the herd is raised. Milk used in the production of farmstead cheese may not be obtained from any outside source.[3]
- NC State University produces its own ice cream—called Howling Cow—and it is produced on campus in their dairy processing lab. The fresh milk and cream used comes from the NC State Dairy Farm.

**Vocabulary**

**Bacteria**: tiny organisms that cause milk to sour

**Brine**: very salty water
**Butterfat**: the fat contained in milk
**Condense**: to remove part of the water in a substance
**Curd**: the custard-like substance that forms when milk ferments
**Hay**: clover, alfalfa, or grass that cows eat
**Mozzarella**: mild, white, semi-soft Italian cheese
**Pasteurize**: to expose milk to a high temperature to destroy microorganisms
**Protein**: a basic nutritional requirement for all living things
**Rennet**: liquid containing enzymes from a calf's stomach
**Silo**: a tall structure used to store hay and grain on a farm or milk at a dairy plant
**Soybean meal**: high-protein grain fed to dairy cows
**Starter culture**: liquid containing acid-forming bacteria that sours milk
**Whey**: the watery substance that separates from milk as cheese is made
**Animal nutritionist**: a person who specializes in animal nutrition, concerned with dietary needs of animals in captivity such as livestock, pets, and animals in wildlife rehabilitation facilities
**Dairy cow**: a cow raised by a farmer for milk production
**Herbivore**: an animal such as a cow that feeds on plants

**Jenna, A Dairy Farmer**[1]

1. Show students the video clip, Jenna, A Dairy Farmer, which is about a seventh generation dairy farmer from Indiana who has taken a special interest in showing other school-age children what it's like to live on a dairy farm.
2. After watching the video, ask the students the following questions:
    a. What tools or technology did you notice in the video necessary for the production of the milk? (*milking machines, milking parlor, refrigerated holding tanks, pedometer*)
    b. What is different about how farmers produced milk and cheese in the past? (*cows are no longer milked by hand*)
    c. Does milk come from the store? (*no, it originates directly from the dairy cows that live on a farm*)
    d. How has technology made it easier for us to buy so many different kinds of food products from the store? (*refrigeration, and refrigerated transportation*)

**Tool Identification**[1]

1. Print the *Dairy Tool Picture cards* (attached to this activity sheet and in **Links** below).
2. Divide students into groups of three or four.
3. Place the eight different pictures in different areas of the classroom with one *Recording Sheet* (attached to this activity sheet and in **Links**). Each group will begin at one of the stations to record their responses on the *Recording Sheet* as Group One. As they move to the next picture, they will record their responses in chronological order such as Group

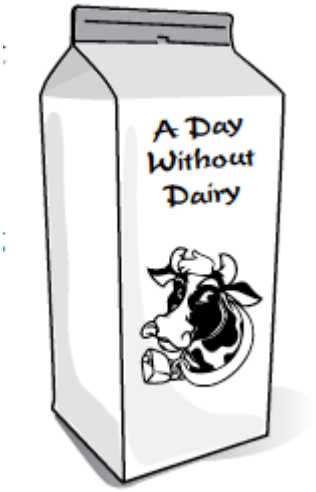
Two, Group Three, Group Four, etc. until all the student groups have recorded their answers for each of the eight tools.

4. Instruct student groups to record their hypothesis and answers for identifying each dairy tool.
5. The *Recording Sheet* will remain with the object rather than traveling with the student group. Encourage each student group not to duplicate answers from the previous group. Their ideas about each dairy tool must be original and based on collaborative discussions from the students in each group.
6. Allow student groups 15 minutes for examining the dairy tool and completing the questions. As the students are writing their observations, float between groups and ask guiding questions such as:
    a. What material do you think the item was made from? (wood or metal)
    b. Why do you think the milk cans were so small? (easier to be carried and lifted into the delivery truck)
7. When students arrive at the last photograph, give them the following directions: You will write a descriptive history in one or two paragraphs for this object.
8. Read through each group's description. You can use these descriptions to combine ideas or add ideas from your group. Write the history from the first person perspective, such as, "I am a _____ and I was used for _____."
9. Have each group share their story with the class.
10. Use the *Background Information for Dairy Objects* (attached to this activity sheet and in **Links**) to reveal the name and description of each tool.
11. Place the following questions on a white board or chart paper for each student to answer on a 3 x 5 index card, individually:
    a. Did your personal experiences influence you during this writing activity? If so, how?
    b. Did the opinions of your group members influence you during this process? If so, how?
    c. How would your hypothesis about each item have changed if you had the actual object instead of the picture?
    d. What is an artifact? What do they tell us about a culture?
    e. Why do you think we are unfamiliar with these items?
    f. What are the benefits to farmers for replacing these older dairy tools with new tools and technology used today?
12. Once the students have answered the questions, instruct them to move to an area in the classroom and sit in a circle for a Text, Talk, Time. Have them bring their index cards.
    a. Thumb up: Share new information
    b. Two fingers: Add to an answer
    c. Teacher's hand up: Students are quiet, the next question is asked.
13. Use Text, Talk, Time until all questions have been answered and discussed among the students.

14. Lastly, show students pictures of modern tools, equipment, and technology that dairy farmers use today from the book, Extra Cheese, Please! Ask students, “How have these improvements helped dairy farmers?”

**Economy of the Diary Industry/A Day Without Dairy**[4]

1. Take a poll of the class to determine the student’s favorite type of cheese: Mozzarella, American, Cheddar or Swiss. Create a chart on the board to record the students’ responses to the poll. Ask the students what type of graph should be used to illustrate the information. Students can work in groups or as a class to create the appropriate graph.
2. Review with the students the purpose of graphs in displaying important information. A large part of economist’s job is collecting data, creating graphs and interpreting those graphs to determine changes in the market. Why would it be beneficial for someone in the dairy industry (or any other agricultural industry) to be interested in the changes within the agriculture market?
3. Explain that economists and dairy farmers alike use graphs to determine the importance of dairy product sales in the economy.
4. Work with students to estimate the economic impacts of a day without dairy in North Carolina. For example, poll the class to determine the amount of dairy products the class consumes daily (milk, cheese, ice cream, etc.). Use multiplication to estimate the amount of dairy products consumed by the entire school, city, state, and country. Discuss with the class:
    a. The amount of money lost in a day without dairy. (using average costs of items at the grocery store)
    b. The dairy industry’s impact on jobs and employment.
    c. The basic concept of supply and demand.
    d. If North Carolina stopped producing milk, how would we get dairy products? How would this affect prices at the store?
5. Have students review their learning by creating “A Day Without Dairy”
   milk carton. Instruct the students to decorate a milk carton depicting newly-acquired concepts on each side. If time allows, they can make their
   carton colorful and creative.
    a. Side 1 – Title: A Day Without Dairy, Drawing, Name
    b. Side 2 – Answer the following question, using complete sentences,
       on lined paper: What would a day without dairy be like? A year?
       Paste your response to the milk carton.
    c. Side 3 – Paste a copy of the bar graph of the class poll.
    d. Side 4 – On a separate piece of paper, list all vocabulary words



learned, including definitions. Paste your list to the milk carton.

Enriching Activities:

- Have the students work in groups to determine statistics they would like to discover about the dairy industry. Students should research and collect the needed information, determine the appropriate type of graph to use, and create a graph that accurately represents the information they collected. The groups will take turns presenting their findings to the class.
- Arrange a field trip to a grocery store where the students can record the prices for commonly consumed dairy products. Have the students keep a "My Day of Dairy" food journal and determine the amount of money spent on the dairy products they personally eat each day.
- Have the students research factors contributing to dairy product sales. What causes an increase or decrease? Use online tools, write a letter to a dairy farmer, or invite a dairy farmer to your class for sources of answers to these (and other) questions about the dairy industry.

**Links**

- North Carolina Cheese Trail (website) http://nccheesetrail.com/
- Jenna, A Dairy Farmer (video) https://www.youtube.com/watch?v=EOAavg4ftFk
- Dairy Tools Pictures https://naitc-api.usu.edu/media/uploads/2016/02/01/Dairy_Tool_Picture_Cards.pdf
- Recording Sheet https://naitc-api.usu.edu/media/uploads/2016/01/23/Recording_Sheets_.pdf
- Background Information for Dairy Objects https://naitc-api.usu.edu/media/uploads/2016/01/23/Background_Information_for_Dairy_Objects.pdf
- Southwest Dairy Farmers Mobile Dairy Classroom https://www.southwestdairyfarmers.com/pages/mobile-dairy-classroom
- Randleigh Dairy Heritage Museum https://howlingcow.ncsu.edu/randleigh-dairy-heritage-museum/

**Sources**


1. https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=16
2. http://www.charlottemagazine.com/Charlotte-Magazine/July-2018/North-Carolina-Is-Quietly-Producing-Some-of-the-Countrys-Best-Cheeses/
3. http://nccheesetrail.com/
4. https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=255


**K-5 Subject Areas**

Speaking and Listening, Writing, Math, Science, and Social Studies

**Common Core/Essential Standards**

**Speaking and Listening**

- **SL.K.1** Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.
- **SL.1.1** Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
- **SL.2.1** Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
- **SL.3.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.4.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.5.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.K.2** Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
- **SL.1.2** Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
- **SL.2.2** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
- **SL.3.2** Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
- **SL.4.2** Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
- **SL.5.2** Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
- **SL.K.4** Speak audibly and express thoughts, feelings, and ideas clearly.
- **SL.1.4** Produce complete sentences to describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
- **SL.2.4** Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent and complete sentences.
- **SL.3.4** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly in complete sentences at an understandable pace.
- **SL.4.4** Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; adjust speech as appropriate to formal and informal discourse.
- **SL.5.4** Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; adapt speech to a variety of contexts and tasks.

**Writing**

- W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.
- **W.1.2** Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide closure.
- **W.2.2** Write informative /explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.
- **W.3.2** Write informative /explanatory texts to examine a topic and convey ideas and information clearly.
- **W.4.2** Write informative /explanatory texts to examine a topic and convey ideas and information clearly.
- **W.5.2** Write informative /explanatory texts to examine a topic and convey ideas and information clearly.
- **W.K.5** Participate in shared investigation of grade appropriate topics and writing projects.
- **W.1.5** Participate in shared research and writing projects.
- **W.2.5** Participate in shared research and writing projects.
- **W.3.5** Conduct short research projects that build knowledge about a topic.

- **W.4.5** Conduct short research projects that build knowledge through investigation of different aspects of a topic.
- **W.5.5** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

**Math**

- **NC.3.MD.3** Represent and interpret scaled picture and bar graphs**:**
  - Collect data by asking a question that yields data in up to four categories**.**
  - Make a representation of data and interpret data in a frequency table, scaled picture graph, and/or **scaled** bar graph with axes provided.
  - Solve one and two-step "how many more" and "how many less" problems using information from these graphs.

**Science**

- **K.P.2** Understand how objects are described based on their physical properties and how they are used.

**Social Studies**

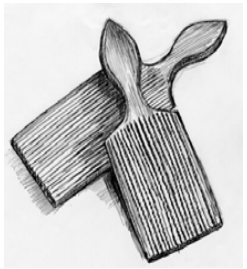
- **1.H.1** Understand that history tells a story of how people and events changed society over time.
- **4.G.1** Understand how human, environmental and technological factors affect the growth and development of North Carolina.
- **5.G.1** Understand how human activity has and continues to shape the United States.
- **5.E.1** Understand how a market economy impacts life in the United States.

# I'M A MOO-STERY!

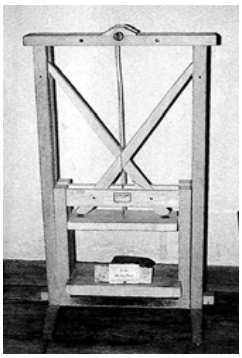
*Background Information for Dairy Objects*

**Object One**: This object is a milk tester. It was used to test the fat content of milk and cream. It was produced by Dr. S.M. Babcock in 1890. These small hand-cranked devices were commonly found on dairy farms. Farmers used milk testers to compare the butter fat content of milk from each cow.

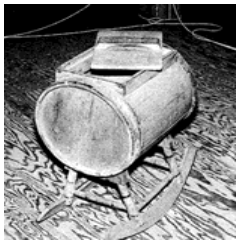
**Object Two**: This object is a cream separator. Invented in 1890 by C.G.P. Delavai this machine was used to separate cream from the milk. The machine eliminated doing this task by hand and transporting whole milk to the creamery.



**Object Three**: This object is a butter paddle. After the cream was churned, the butter was placed in a large bowl. This tool was used to separate the butter from the buttermilk to form it into a solid shape.



**Object Four**: This object is a self-acting cheese press. One step in the cheese making process is to press the cheese curds and drain the access liquid. This press uses the weight of the cheese to reduce the amount of moisture. This type of cheese press was commonly used in smaller dairies.



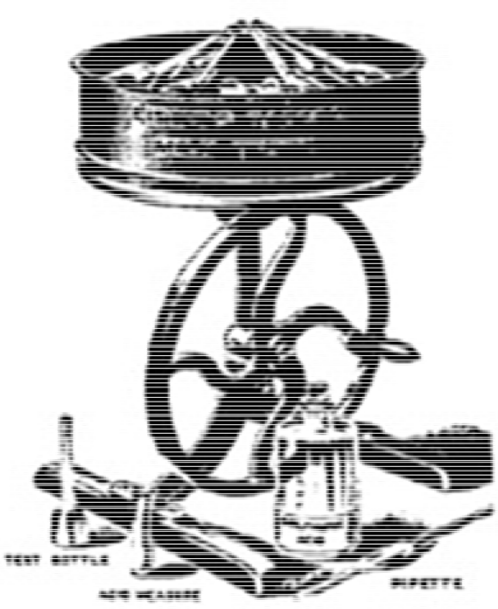
**Object Five**: This object is a foot operated butter churn. Hands-free, this type of churn allowed the operator to do something else! Butter churns separated the butter milk and butter. The primary purpose of having dairy cows was to provide a family with milk and butter. Farm production of butter started in 1791.

**Object Six**: This object is an 8 gallon milk can used for storing, cooling and transporting milk. In the1940s and 50s the addition of bulk tanks on the farm and tanker trucks replaced milk cans. Milk cans came in 5, 8, and 10 gallon sizes. Sturges & Burn Manufacturing Company of Chicago, Illinois was a milk can manufacturer.

**Object Seven**: This object is a delivery truck. The earliest milk haulers used flat-bed delivery trucks to transport milk cans of various sizes along with other items such as eggs and ice.

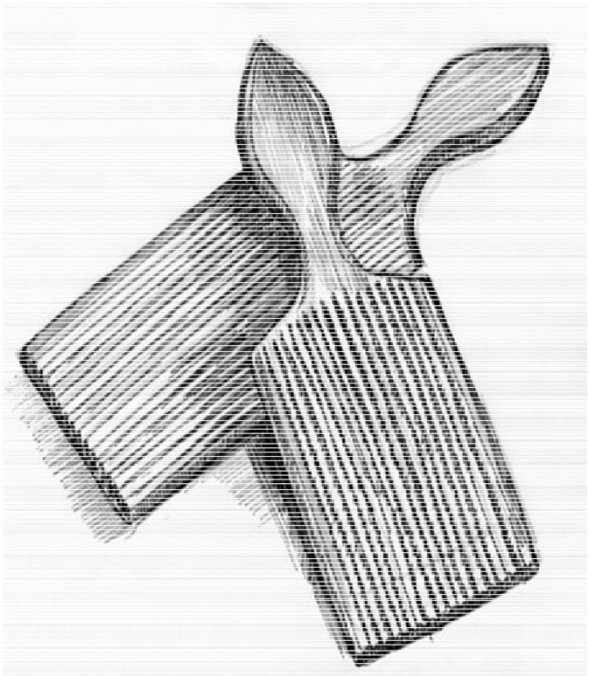
**Object Eight:** This object is a milk bottle. Milk was delivered to houses by a milk man in glass bottles. They were thought to keep milk at its coolest temperatures.

## Object One

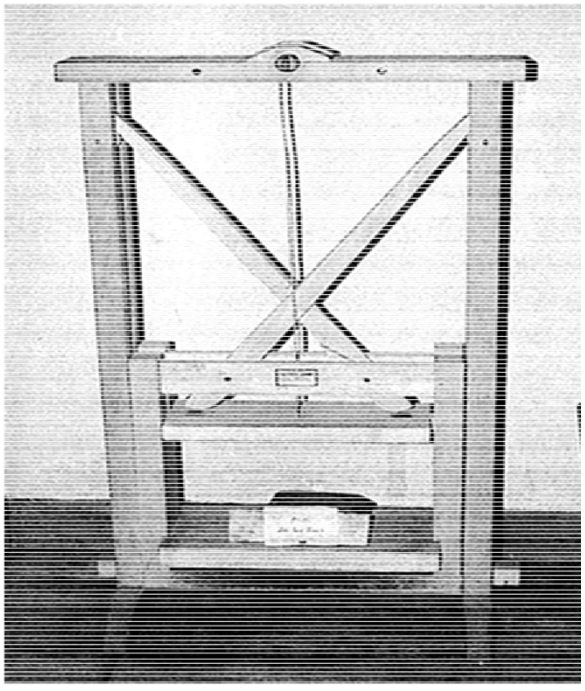


## Object Two

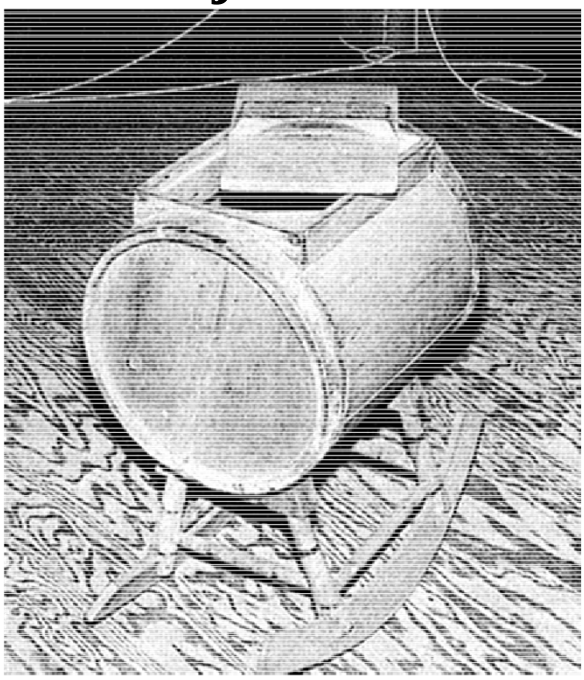
## Object Three



## Object Four



## Object Five



## Object Six

## Object Seven

## Object Eight

# Recording Sheet

## Group 1:
What is this object?
Who might have
used it? What was it
used for?
How do you know?
Is it still used today? Why or why not?

## Group 2:
What is this object?
Who might have
used it? What was it
used for?
How do you know?
Is it still used today? Why or why not?

## Group 3:
What is this object?
Who might have
used it? What was it
used for?
How do you know?
Is it still used today? Why or why not?

## Group 4:
What is this object?
Who might have
used it? What was it
used for?
How do you know?
Is it still used today? Why or why not?

## Group 5:
What is this object?
Who might have
used it? What was it
used for?
How do you know?
Is it still used today? Why or why not?



*Original Idea adapted from Inquiry Based Learning Using Everyday Objects by Amy Edmonds Alvarado and Patricia R. Herr.*

## Group 6:

What is this object?
Who might have
used it? What was it
used for?
How do you know?
Is it still used today? Why or why not?

## Group 7:

What is this object?
Who might have used it?
What was it used for?
How do you know?
Is it still used today? Why or why not?

## Group 8 Descriptive History: