Dairy

*Lesson Plan for Grade 2, Science*

*Prepared by NAITC*

*Modified by Mississippi State University, School of Human Science*

*for Mississippi Farm Bureau Federation - AITC*

OVERVIEW & PURPOSE

Students will make observations and learn about historic tools used on a dairy farm to store and process milk into cheese and butter.

# EDUCATION STANDARDS

**Mississippi College-and-Career Readiness Standards:**

P.2.6.3 Develop a plan to change the force (push or pull) of friction to solve a human problem (e.g., improve the ride on a playground slide or make a toy car or truck go faster). Use an engineering design process to define the problem, design, construct, evaluate, and improve the plan.

ELA-SL.2.1 Participate in collaborative conversations with diverse partners about grade 2 topics and text with peers and adults in small and larger groups.

**NALOs:**

T4.K-2 b Recognize and identify examples of simple tools and machines used in agricultural settings (e.g., levers, screws, pulley, wedge, auger, grinder, gears, etc.).

# OBJECTIVES

* Students will observe historic tools used on a dairy farm

# MATERIALS NEEDED

Activity 1:

* Pencils (1 per student)
* Dairy Tool Picture Cards (1 set)
* Recording Sheets (1 per student)
* Background Information for Dairy Objects (1 set)
* 3 x 5 index cards for each student
* Modern Dairy Picture Cards (1 set)

### Essential Files (maps, charts, pictures, or documents)

* [Dairy Tool Picture Cards](https://drive.google.com/file/d/1kxVxnl68V3XCuOhQmx4-Rj-Ek9t23i0i/view?usp=drive_link)
* [Modern Dairy Picture Cards](https://drive.google.com/file/d/1f-79UQgbwvk9SwUjdaLQSqClQVUk4DO-/view?usp=drive_link)
* [Recording Sheets](https://drive.google.com/file/d/1o4j4c5IubhBZXV1QXyAqpKyLQULYb0At/view?usp=drive_link)
* [Background Information for Dairy Objects](https://drive.google.com/file/d/1ofk9yxl5x1nC-z5GFaKOhOg9pMQ-Y4YV/view?usp=drive_link)

### Essential Links

* [Text, Talk, Time](https://www.teachingchannel.org/videos/analyzing-text-as-a-group)
* [The Journey of Milk](https://www.youtube.com/watch?v=nx0KYWxrO1k)

# Lesson Set Up:

1. Print the Dairy Tool Picture cards.
2. Predertime groups of students in three or four students per group.

# Place the eight *Dairy Tool Picture Cards* in different areas of the classroom

1. Print a Recording Sheet(1 per tool) and place with each of the tools.

# Place the following questions on a white board or chart paper for each student to answer on a 3 x 5 index card, individually.

# Did your personal experiences influence you during this writing activity? If so, how?

# Did the opinions of your group members influence you during this process? If so, how?

# How would your hypothesis about each item have changed if you had the actual object instead of the picture?

# What is an artifact? What do they tell us about a culture?

# Why do you think we are unfamiliar with these items?

# What are the benefits to farmers for replacing these older dairy tools with new tools and technology used today?

# Vocabulary

**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

# Ag 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.
* Before modern milk delivery, when people traveled and wanted milk, they had to take their cows with them.
* Vanilla is America's favorite ice cream flavor.
* The U.S. dairy industry conducts more than 3.5 million tests each year to certify the milk we drink is safe and wholesome.

# Background Information for Teacher:

Dairy farmers in the United States provide milk, cheese, and yogurt from approximately 51,000 farms while 97% are family-owned. The average herd size in the U.S. consists of 115 dairy cows and each cow can produce 6-7 gallons of milk per day. **Dairy cows** are strictly female cows raised by a farmer for milk production. California is known as the highest milk-producing state as it yields 21% of our nation's milk production. For this lesson student's experiences for drinking milk and eating dairy products such as yogurt, cheese, or ice cream would be required for helping them gain an understanding for the use of tools and technology on a dairy farm.

Through time, many tools and technology have been developed to improve the quality, processing, and safe storage of milk and other dairy products. The following tools were used in earlier times before transportation provided refrigeration and adequate storage.

* A **milk tester** 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 it to compare the butter fat content of milk from each cow.
* A **cream separator** was invented in 1890 by C.G.P. Delavai and was used to separate cream from the milk. This machine eliminated this task by hand for transporting whole milk to the creamery.
* A **butter paddle** was used after the cream was churned and the butter was put in a large bowl. This tool was used to separate the butter from the buttermilk and to form butter into a solid form.
* The **self-acting cheese press** performs one step in the cheese making process by pressuring the cheese curds and helping drain the excess liquid. This press used the weight of the cheese to extract the moisture out of it. This type of cheese press was commonly used in smaller dairies.
* The **foot operated butter churn** was hands-free and allowed you 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.
* The 8 gallon **milk can** was used to store and transport cooled milk. Until the adoption of farm bulk tanks and tanker trucks in the 1940s and 50s, milk was kept in these cans which came in 5, 8, and 10 gallon sizes. Sturges & Burn Manufacturing Company of Chicago, Illinois was a large manufacturer of milk cans.
* 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.
* Milk was delivered to houses by a milkman in glass **milk bottles** that were thought to keep milk at its coldest temperatures.

Today, a dairy farmer is most concerned about the health of their cows for maintaining a good supply of milk. Three main areas of focus include a nutritious diet, healthy living conditions, and good medical care for the dairy cows. Most importantly farmers must provide a healthy diet of 100 pounds of food and 25 - 50 gallons of water each day for his/her dairy cows. An **animal nutritionist** can aid a farmer in creating a feed formulated with the correct nutrients for a well-balanced diet. Dairy cows also spend time in a pasture for grazing and acquiring fiber for their **herbivore** diets. Today, the following tools and technologies are used to provide delicious dairy products such as milk, yogurt, cheese, and ice cream.

* Dairy cows are kept in comfortable conditions in and out of the **milking parlor,** a separate building where cows enter for milking 2-3 times a day.
* Dairy cows have access to feed as well as fresh, clean water 24 hours a day in a **free-stall barn** that allows cows to eat, drink, and sleep whenever and wherever they choose.
* The cows are milked 2-3 times a day by the use of **milking machines** that automatically and safely remove milk from the cow's udder.
* The milking machines transport milk directly from the cow to a refrigerated **bulk tank**, located on the farm where milk is cooled to between 38 to 45 Fahrenheit to preserve freshness and safety.
* Milk is transported to processing plants by **tanker trucks** that are equipped to haul milk under safe conditions.
* Farmers use **ear tags** that contain a number assigned to a particular cow to help maintain accurate health and milk production records.
* A **methane digester** is used to convert cow manure into methane gas burned into fuel to create electricity used on the dairy farm.
* On larger dairy farms a storage building called a **silo** is used to store silage, a high-moisture forage eaten by cows.

# LEARNING PROCEDURES

Interest Approach:

# To create student interest, show the video clip, *The Journey of Milk.*

# At the completion of the video ask the following questions:

# **"What tools or technology did you notice in the video necessary for the production of milk?**" (*milking machines, milking parlor*, *refrigerated holding tanks, pedometer*)

# **"What is different about how farmers produced milk and cheese in the past?"** (*cows are no longer milked by hand)*

# **"Does milk come from the store?"** (*no, it originates directly from the dairy cows that live on a farm*)

# **"How has technology made it easier for us to buy so many different kinds of food products from the store?"** (*refrigeration, and* *refrigerated transportation*)

### Procedures

# Activity 1: Tool Identification

# Print the *Dairy Tool Picture Cards* found in the *Essential Files.*

# Divide students into groups of three or four.

# Place the eight *Dairy Tool Picture Cards* in different areas of the classroom with one *Recording Sheet*. 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 student groups have recorded their answers for each of the eight tools.

# Instruct student groups to record their hypothesis and answers for identifying each dairy tool.

# 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.

# 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:

# "What material do you think the item was made from?" (*wood or metal*)

# "Why do you think the milk cans were so small?" (*easier to be carried and lifted into the delivery truck*)

# When students arrive at the last photograph, give them these directions: You will write a descriptive history in one or two paragraphs for this object.

# 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 \_\_\_\_\_\_.*”

# Have each group share their story with the class.

# Use the *Background Information for Dairy Objects* to reveal the name and description of each tool.

# Place the following questions on a white board or chart paper for each student to answer on a 3 x 5 index card, individually.

# Did your personal experiences influence you during this writing activity? If so, how?

# Did the opinions of your group members influence you during this process? If so, how?

# How would your hypothesis about each item have changed if you had the actual object instead of the picture?

# What is an artifact? What do they tell us about a culture?

# Why do you think we are unfamiliar with these items?

# What are the benefits to farmers for replacing these older dairy tools with new tools and technology used today?

# 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, and Time discussion. Have them bring their 3 x 5 index cards.

# Refer to the Text, Talk, and Time Chart below to emphasize the rules of this strategy. To see a demonstration, watch the Text, Talk, and Time strategy [video](https://www.teachingchannel.org/videos/analyzing-text-as-a-group). Rule reminders:

# Thumbs up: Share new information

# Two fingers: Add to an answer

# Teacher's hand up: Students are quiet, the next question is asked

# Use Text, Talk, Time until all questions have been answered and discussed among the students.

# In conclusion, show the students pictures of modern tools, equipment, and technology that dairy farmers use today from the *Modern Dairy Picture Cards* provided in the *Essential Files*. Ask students, "How have these improvements helped dairy farmers?"

# **Concept Elaboration and Evaluation:**

# At the conclusion of this activity, review and summarize the following key concepts:

# Dairy farmers use tools and technology for producing safe and delicious milk and milk products.

# Dairy farmers provide a nutritious diet, safe living conditions, and good medical care for their cows.

# Tools and technology for any industry make improvements to meet consumer demand and improve our way of life.

# Additional Learning Procedures

To help students review and elaborate more about dairy, try using the [“I used to think…Now I think…”](https://drive.google.com/file/d/1Q-MCQ14mpoDQr9hkGtUG3kiiKtwvOG07/view?usp=drive_link) method to allow students to think deeper and make new connections.

To create different learning opportunities for students try reading aloud [“Modern Farms”](https://www.agfoundation.org/recommended-pubs/modern-farms) introducing children to farm life with accurate depictions of modern agriculture.



Source: <https://www.agclassroom.org/teacher/matrix/>

*The MS Farm Bureau Women’s Committee has additional resources to help aid you in this lesson with a life size cow prop, please contact Dedra Luke at 601-977-4169 to learn more!*

*For more information and additional lessons visit*

[*https://msfb.org/ag-in-the-classroom/lesson-plans/*](https://msfb.org/ag-in-the-classroom/lesson-plans/)*.*