Agricultural Literacy Curriculum Matrix

Kansas Agriculutre in the Classroom

It's a MOO-stery! (Grades K-2)

Grade Levels

K - 2

Purpose

Students will be introduced to the dairy industry and will make observations about how historic tools such as a butter paddle, cheese press, and milk tester can be used to process milk on a dairy farm.

Estimated Time

2 - 40 minute sessions

Materials Needed

Interest Approach — Engagement:

- Jenna, A Dairy Farmer (https://www.youtube.com/watch?v=EOAavg4ftFk)

Activity 1: Dairy Fun Facts

- Illinois Dairy Ag Mag (http://www.agintheclassroom.org/TeacherResources/AgMags/Dairy%20Ag%20Mag%20for%20SmartBoard.pdf) (one per student or one electronic copy can be displayed on the whiteboard from the website)

- Dairy Farm Fact Sheet (https://cdn.agclassroom.org/media/uploads/2016/02/03/Dairy_Farm_Fact_Sheet.pdf) (one per student)

Activity 2: Dairy Farm Tools

- Illinois Dairy Ag Mag (http://www.agintheclassroom.org/TeacherResources/AgMags/Dairy%20Ag%20Mag%20for%20SmartBoard.pdf) (one per student or one electronic copy can be displayed on the whiteboard from the website)
- Historic Dairy Tool Picture Cards (https://cdn.agclassroom.org/media/uploads/2016/05/24/Historic_Dairy_Tool_Picture_Cards.pdf) (one set per student group)
- Dairy Tool Description Cards (https://cdn.agclassroom.org/media/uploads/2016/02/03/Dairy_Tool_Description_Cards_-_.pdf) (one set per student group)
- Modern Dairy Tool Writing Assignment (https://cdn.agclassroom.org/media/uploads/2016/02/03/Dairy_Tool_Writing_Assignment.pdf) (one per student)
- Modern Dairy Picture Cards (https://cdn.agclassroom.org/media/uploads/2016/05/24/Modern_Dairy_Picture_Cards_1.pdf) (one teacher set)

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

- Dairy Farm Fact Sheet (https://cdn.agclassroom.org/media/uploads/2016/02/03/Dairy_Farm_Fact_Sheet.pdf)
- Dairy Tool Description Cards (https://cdn.agclassroom.org/media/uploads/2016/02/03/Dairy_Tool_Description_Cards_-_.pdf)
- Dairy Tool Writing Assignment (https://cdn.agclassroom.org/media/uploads/2016/02/03/Dairy_Tool_Writing_Assignment.pdf)
- Historic Dairy Tool Picture Cards (https://cdn.agclassroom.org/media/uploads/2016/05/24/Historic_Dairy_Tool_Picture_Cards.pdf)
- Modern Dairy Picture Cards (https://cdn.agclassroom.org/media/uploads/2016/05/24/Modern_Dairy_Picture_Cards_1.pdf)

Vocabulary Words

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

Did You Know? (Ag Facts)

- It used to take a person 1 hour to milk 6 cows by hand. Today, a person can milk 100 cows or more in an hour with the use of modern machines.[1]
- Before modern milk delivery, when people traveled and wanted milk, they had to take their cows with them.[1]
- Vanilla is America's favorite ice cream flavor.[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.[2]

Background Agricultural Connections

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 access 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 milk man in glass **milk bottles** that were thought to keep milk at its coolest 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 technology 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.

Interest Approach - Engagement

1. To create student interest, show the video, Jenna, a Dairy Farmer (https://www.youtube.com/watch?v=EOAavg4ftFk)which is about a seventh generation dairy farmer from Indiana who has taken a special interest in showing other school-age children what its like to live on a dairy farm.

2. 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: Dairy Farm Facts

1. Take a quick picture walk with the students using the Illinois Dairy Ag Mag (http://www.agintheclassroom.org/TeacherResources/AgMags/Dairy%20Ag%20Mag%20for%20SmartBoard.pdf), to familiarize the students with the text prior to reading it out loud. Ask leading questions such as:
    - "What will we be learning about?" (*dairy cows, dairy farms*)
    - "Where do you think dairy cows are milked?" (*milking parlor*)
    - "How does the milk get from the farm to the grocery store?" (*tanker trucks*)
2. Begin reading sections from the *Illinois Dairy Ag Mag*, stopping to ask questions that summarize what was read. Focus on the sections that highlight characteristics of the dairy cow and nutrition from dairy products.
3. Provide each student with a *Dairy Farm Fact Sheet* for recording four fun facts that they learned.
4. Instruct the students to state facts regarding the dairy cows. For example, "A dairy cow is a female that eats fifty pounds of food and drinks fifteen gallons of water a day." As the students write their observations, float between the students and ask guiding questions. Have the Ag Mag available in case they want to review a page.
5. If younger students are unable to construct sentences, ask them to draw a picture depicting what they learned.
6. Place the students into groups of 3 to 4 per group. Have them share with the group what they learned written or drawn on their *Dairy Farm Fact Sheet*.
7. Next have the groups exchange their *Dairy Farm Fact Sheets* with another group and have them report out what different facts they learned not listed on their original sheets.
8. To wrap-up the activity, remind students that milk is used to make delicious dairy products such as cheese, butter, ice cream, sour cream, and whipping cream.
9. Take a survey and asks the students which dairy product they enjoy the most; butter, cheese, or ice cream? Once the votes are tallied show the video of the dairy product that received the most votes found in the *Illinois Dairy Ag Mag* on page 2 under the heading, "Utterly Cool." By clicking the mouse on the video camera icon, the video will begin to play.

Activity 2: Dairy Farm Tools

1. Refer back to the Illinois Dairy Ag Mag (http://www.agintheclassroom.org/TeacherResources/AgMags/Dairy%20Ag%20Mag%20for%20SmartBoard.pdf)and read the sections found on pages 3 - 4 beginning with *Milk: From the Farm to your Kitchen.* Point out the tools and technology that are used today for producing milk and delivering it to the grocery stores. Remind the students that long ago the process took much longer. Refer to

the *Background* for discussing the older version of milking dairy cows and producing dairy products such as butter and cheese.

2. Print a set of the Historic *Dairy Tool Picture Cards* and the *Dairy Tool Description Cards* found in the *Essential Files* for each student group.
3. Divide students into groups of three or four as done in *Activity 1*. Pass out 1 set of Historic *Dairy Tool Picture Cards* and the *Dairy Tool Description Cards*.
4. Instruct the students to match the historical dairy tool with its correct description.
5. Once the groups have made their matches, use the *Background Information for Dairy Objects* found in the *Essential Files* to clarify the correct matches.
6. Next, pass out the *Dairy Tool Writing Assignment* found in the *Essential Files* as an evaluation. Post both student documents completed from *Activity 1 & 2* in the room on a bulletin board, titled "I'm a MOO-stery." This lesson would compliment content that focuses on healthy eating when talking about dairy products on the MyPlate graphic organizer.
7. 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*. Descriptions of these tools can be found in the *Background.*
8. Ask students, "How have these improvements helped dairy farmers provide safe dairy products for us to eat and drink?"

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.

Essential Link

- Jenna, A Dairy Farmer (https://www.youtube.com/watch?v=EOAavg4ftFk)

We welcome your feedback (https://usu.co1.qualtrics.com/jfe/form/SV_4HhIVpN4L8IC2lT)! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

Have students read authentic accounts of butter making and other artifacts at Butter Through the Ages (http://webexhibits.org/butter/index.html).

Invite a dairy farmer to your class for talking about the tools and technology he/she uses on the farm to produce milk.

Use the lesson plan Milk Makin' Math (https://iframe.agclassroom.org/kansas/lesson/117/) to explore career opportunities involved in the dairy industry and practice related math problems.

Sources

Original idea adapted from ***Inquiry-Based Learning Using Everyday Objects*** by Amy Edmonds-Avarado and Patricia R. Herr.

1. http://www.umpquadairy.com/recipes-more/cool-cow-facts/ (http://www.umpquadairy.com/recipes-more/cool-cow-facts/)
2. http://www.dairyfarmingtoday.org/Pages/Home.aspx (http://www.dairyfarmingtoday.org/Pages/Home.aspx)

Suggested Companion Resources

- Better Butter (https://iframe.agclassroom.org/kansas/resource/28/)
- Farm Pop-Ups (https://iframe.agclassroom.org/kansas/resource/132/)
- Big Book of Big Tractors (https://iframe.agclassroom.org/kansas/resource/250/)
- Clarabelle (https://iframe.agclassroom.org/kansas/resource/11/)
- Extra Cheese, Please! (https://iframe.agclassroom.org/kansas/resource/26/)
- Hey, Hey, Hay! (https://iframe.agclassroom.org/kansas/resource/927/)
- Kiss the Cow! (https://iframe.agclassroom.org/kansas/resource/27/)
- Let's Make Butter (https://iframe.agclassroom.org/kansas/resource/372/)
- Make Mine Ice Cream (https://iframe.agclassroom.org/kansas/resource/224/)
- Milk Comes From a Cow? (https://iframe.agclassroom.org/kansas/resource/381/)
- The Milk Makers (https://iframe.agclassroom.org/kansas/resource/146/)
- About...Books (https://iframe.agclassroom.org/kansas/resource/123/)
- Livestock Cards (https://iframe.agclassroom.org/kansas/resource/791/)
- Hilmar Cheese Company Virtual Video Tour (https://iframe.agclassroom.org/kansas/resource/177/)
- Make Mine Milk (https://iframe.agclassroom.org/kansas/resource/225/)
- Moo 2 You DVD (https://iframe.agclassroom.org/kansas/resource/816/)
- The Journey of Milk (https://iframe.agclassroom.org/kansas/resource/234/)

- Discover Dairy (https://iframe.agclassroom.org/kansas/resource/176/)

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