Even though North Dakota isn’t a major dairy-producing state, the industry is important to our economy. The state now has 95 dairy farms with 18,000 cows. Annual milk production is about 342 million pounds.

The Agriculture Cycle

Idea: Introduce this Ag Mag by talking about the Agriculture Cycle. Ask students to brainstorm dairy production, processing, distribution and consumption.
Answers to Moo Math
1. 144 cups per day $\times$ 305 days
   $= 43,920$ cups of milk in a year
2. 144 cups $\div$ 16 cups per gallon
   $= 9$ gallons per day
3. 15 cows $\div$ 6 cows per hour
   $= 2.5$ hours
4. 60 minutes in one hour $\div$ 5 minutes
   $= 12$ 5-minute increments in one hour
   $12$ 5-minute increments $\times$ 6 cows per 5-minute increment
   $= 72$ cows milked in one hour
5. 9,000,000 $\times$ 0.90
   $= 8,100,000$ Holsteins in the U.S.

Answers to North Dakota’s Dairy Cows (2013)

Idea: Have students design their own Holstein patterns. Provide each student with a cow outline, and have them put their names on the back. Using black paint and a sponge or their thumb, have students create a Holstein pattern on the cow outline. Once the cow paintings are dry, have students examine their cows and look for distinguishing patterns, such as a tic-tac-toe board or Big Dipper. Have students think of a name for their cow based on the pattern they identify. Have them write the name of the cow on the back of the paper. Hang all the cows around the room and see if students can identify their own cow by using her name to remember her pattern.

From the National Dairy Council

Dairy Processing

Answers to How Much Milk Does It Take?
1 pound butter
8 ounces yogurt
½ gallon ice cream
1 dozen eggs
1 pound cottage cheese
1 pound American cheese
2 cups evaporated milk

From the National Dairy Council

Idea: Make a Polymer – The first plastics were made from natural sources such as milk, trees and plants. Plastics are made through a process called polymerization. In this process, molecules called monomers combine with each other to form larger molecules called polymers. These unique man-made polymer chains give plastics their special characteristics.

Materials:
1 cup milk
2 tablespoons white vinegar

Instructions:
Warm milk in a pan. Stir in vinegar. A white rubbery material forms. Take this out, wash it under the tap and shape it into objects such as marbles. Leave it for a few days, and the material will harden.

Discuss:
Explain to the students how the vinegar and milk react to coagulate casein. Protein molecules in the milk, which are so long they can bend, join to make the casein rubbery. As the material dries, the casein molecules shrink, making it hard.

Adapted from Cycling Back to Nature with Biodegradable Polymers, National 4-H Council


Career Corner
Idea: Brainstorm with students other careers related to the dairy industry, or have students list all the careers they can think of related to dairy production, processing, distribution and consumption. Each student could select and explore one career area.
Dairy Consumption


Idea: Have students explore the dairy section and the games, activity sheets, videos and songs in the Kids section of www.ChooseMyPlate.gov.

Idea: Have students bring Nutrition Facts labels from dairy products, and review them together.

Idea: Have students compare the labels of butter and margarine. What are the differences? What are the similarities?

Idea: Homemade Butter

Ingredients and Equipment:
- ½ cup whipping cream
- Salt
- Crackers
- Plastic jar or container

Procedure:
Pour whipping cream into a clean plastic jar. Screw the lid on tightly. Shake the jar vigorously.
After about 10 minutes, yellow clumps will form as the butterfat particles stick together. The clumps will be surrounded by a white liquid.
The liquid is sweet buttermilk.

Drain the liquid from the clumps. Rinse the clumps under cold water. Add a pinch of salt if you like.
Serve on crackers.

From Dairy Helper’s Guide, 4-H Cooperative Curriculum System

Idea: Squeeze Freeze

Supplies:
- Liquid measuring cup
- Measuring spoons – tablespoon, ½ teaspoon
- Paper towels

Needed for each child:
- Small zip-lock plastic bag
- Large zip-lock plastic bag
- Plastic spoon
- ½ cup whole milk
- 1 tablespoon sugar
- ½ teaspoon vanilla
- Ice, crushed or cubes
- 1 tablespoon salt

Setup:
Sugar and vanilla can be put in small plastic bag ahead of time. Salt can be put in large plastic bag ahead of time.

Procedure:
Give each child a small bag containing the sugar and vanilla. Have each child hold open the bag while an adult pours in the ½ cup whole milk. Remove as much air from the bag as possible. Seal bag. It is important bag is sealed properly.

Have the children drop the small bag into the large plastic bag with the salt in it. Add 18-20 ice cubes or crushed ice. Remove as much air as possible from the large bag. Seal properly.

Children should knead the bags about 10 minutes. When a soft ice cream is formed, give spoons to eat out of the bag.

Note: It is important to use whole milk. Other types of milk take too long to freeze. Salt also is very important. Without it, the ice cream will not freeze. One pint of half and half can be added to a gallon of whole milk. This makes the ice cream richer, and it will freeze faster.
Dairy Reading Suggestions for Ages 6-10

A Picture Book of Cows by Dorothy Hinshaw Patent and William Munoz, Holiday House


Extra Cheese, Please! Mozzarella’s Journey from Cow to Pizza by Cris Peterson, Boyds Mills Press

Farm Animals by Angela Hart, Franklin Watts

Farming by Gail Gibbons, Holiday House

From Milk to Ice Cream by Ali Mitgutsch, Carolrhoda (unpublished)

Kowz and Co. by Nancy Gray, Liebl Printing Company

Morning Milking by Linda Morris, Picture Book Studio

The Generous Cow by Bijou LeTord, Parents Magazine Press

The Milk Makers by Gail Gibbons, Holiday House

Wholly Cow by Emily Margolin Gwathmey, Abbeville Press

Resources from the Midwest Dairy Council

www.midwestdairy.com
This site is a one-stop shop for all things dairy. Visit the Dairy Farming section for dairy farming facts and to “meet” Midwest dairy farmers. You also can “request a farmer” to visit your classroom. Visit the Schools & Community section for downloadable Educator Resources that include “From a Farm Family Near You” student handouts and poster, a classroom activity guide and an educational video taking students on a dairy farm tour.

www.DairyMakesSense.com
Dairy Makes Sense is geared to consumers interested in learning more about where their food comes from. This site serves as a hub for showcasing dairy’s nutrition and farm-to-table story, addressing hot topics, and providing dairy recipes, dairy farmer profiles and a blog on the many reasons why dairy makes sense.

North Dakota Social Studies Standards and Benchmarks

Grade 4 Standard 1: Skills and Resources; Benchmark 4: Interpret current events using print and electronic media, e.g. children’s news magazines.

Grade 4 Standard 2: Important Historical Events; Benchmark 10: Explain the significance of agriculture in North Dakota History.

Grade 4 Standard 3: Economic Concepts; Benchmark 2: Identify ways that natural resources contribute to the economy of the local community and North Dakota.

Common Core ELA Standards

Reading

Informational Text, Anchor Standard 2: Determine central ideas or themes of a text, and analyze their development, summarize the key supporting details and ideas. Grade 4 Determine the main idea of a text and explain how it is supported by key details; summarize the text.

Anchor Standard 10: Read and comprehend complex literary and informational texts independently and proficiently. Grade 4 By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in grades 4-5 text complexity band proficiently, with scaffolding as needed at the high end of the range.

Answers to Crossword Puzzle

MOZZARELLA
MILK
CREAM
HOLSTEIN
FEED
SKIMMILK
PROTEIN
"BULLS"

W B G G H W H A M
E R R T L M T E T M
C E W E M N D
FEED
MILK
SKIM
YOGURT
CHEDDAR
CURDS

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North Dakota Agriculture in the Classroom Activities

Each issue of the Ag Mag focuses on an agricultural commodity or topic and includes fun activities, bold graphics, interesting information and challenging problems. Send feedback and suggestions for future Ag Mag issues to:

Becky Koch
NDSU Agriculture Communication
(701) 231-7875
Becky.Koch@ndsu.edu

Another council teacher resource is Project Food, Land & People (FLP). Using the national FLP curriculum, N.D. Ag in the Classroom provides 600-level credit workshops for teachers to instruct them in integrating hands-on lessons that promote the development of critical thinking skills so students can better understand the interrelationships among the environment, agriculture and people of the world. Teachers are encouraged to adapt their lessons to include North Dakota products and resources.

Project Food, Land & People has 55 lessons, including:

• Amazing Grazing
• Cows or Condos?
• Seed Surprises
• Schoolground Caretakers
• Could It Be Something They Ate?
• What Piece of the Pie?
• and many more.

For information, contact:
Jill Vigesaa
N.D. Farm Bureau Foundation
(701) 799-5488
jill.vigesaa@gmail.com

The N.D. Geographic Alliance conducts a two-day Agricultural Tour for Teachers. The tour includes farm and field visits, tours of agricultural processing plants to see what happens to products following the farm production cycle, and discussions with people involved in the global marketing of North Dakota farm products.

For information, contact:
Marilyn Weiser
North Dakota Geographic Alliance
(701) 858-3063
marilyn.weiser@gmail.com

Educators may apply for mini-grants for up to $500 for use in programs that promote K-12 agricultural literacy. Individuals or groups such as teachers, 4-H leaders, commodity groups and others interested in teaching young people about the importance of North Dakota agriculture may apply.

The proposed project must be targeted to young people 5-18 years of age and should enhance student knowledge of the contribution made by agriculture. Applications asking for funds for equipment or curriculum as well as those that involve innovative approaches to promoting agricultural literacy will be given preference. Examples of programs that may be funded: farm safety programs, purchase of agriculture curriculum, celebration of agriculture festivals, agricultural-based books for the local library, farm safety days, startup funds for a small greenhouse project, etc. Visit www.ndaginclassroom.org for ideas that can be used to support your project. Applications are due every year in early September.

For information, contact:
Beth Bakke Stenehjem, N.D. FFA Foundation
(701) 224-8390
bethbakke@btinet.net

North Dakota Agriculture in the Classroom Council

Kim Alberty – Agassiz Seed and Supply, West Fargo
Aaron Anderson – N.D. Dept. of Career and Technical Education
Nancy Jo Bateman – N.D. Beef Commission
Sheri Coleman – Northern Canola Growers Association
Kirk Olson – McKenzie County Farm Bureau
Wendi Mizer Stachler – North Dakota State University

Statutory Member: Superintendent of Public Instruction
Kirsten Baesler (Bob Marthaller, representative)

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