



# Dairy: From Moo to You

## Dairy Production

Even though North Dakota isn't a major dairy-producing state, the industry is important to our economy. The state now has 207 dairy farms with 26,000 cows. Annual milk production is about 418 million pounds.

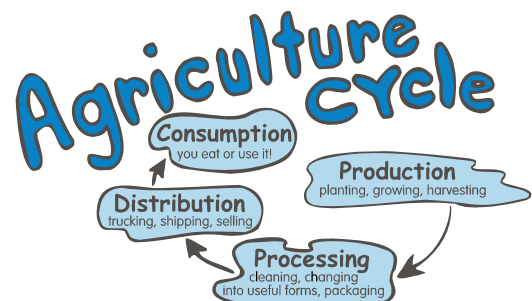


### Answers to Moo Math

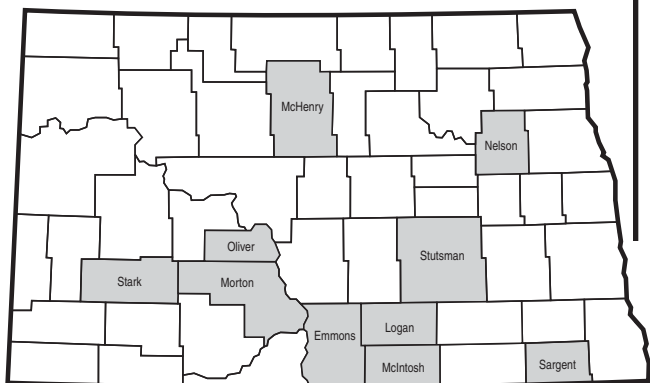
- 110 cups per day X 305 days  
= 33,550 cups of milk in a year
- 110 cups ÷ 16 cups per gallon  
= 6.875 gallons per day
- 15 cows ÷ 6 cows per hour  
= 2.5 hours
- 60 minutes in one hour ÷ 5 minutes  
= 12 5-minute increments in one hour  
12 5-minute increments X 6 cows per 5-minute increment  
= 72 cows milked in one hour
- 9,000,000 X 0.90  
= 8,100,000 Holsteins in the U.S.

## 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 North Dakota's Dairy Cows (2008)



**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.

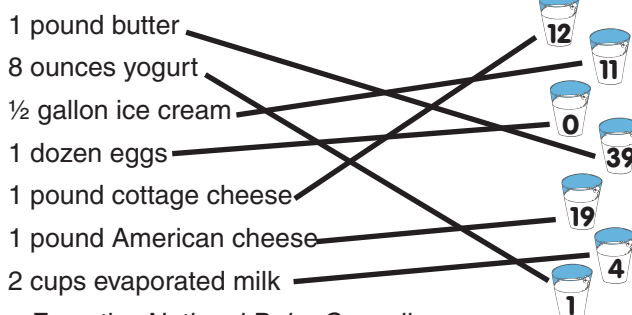
From the *National Dairy Council*

### 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 Processing

### Answers to How Much Milk Does It Take?



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

**Idea:** Study the science of milk and dairy processing by making cheese. See [www.essortment.com/food/basiccheesemaki\\_sbox.htm](http://www.essortment.com/food/basiccheesemaki_sbox.htm).

## Dairy Distribution

### Answers to The Journey of Milk

1. Cows eat nutritiously, drink lots of water and receive special care from their farmer-owners so they can produce milk.
2. Cows are housed in comfortable stalls and milked 2 or 3 times each day.
3. The milk is pumped into a refrigerated storage tank on the farm.
4. The milk is transported in a refrigerated tanker truck to the processing plant.
5. The milk is tested for quality and homogenized and pasteurized if it's to be sold as liquid milk.
6. Some of the milk is processed into cheese, yogurt, ice cream and other dairy products.
7. The dairy products are delivered with refrigerated trucks to stores, schools and restaurants.
8. You purchase dairy products at the store, at school or at a restaurant.
9. You enjoy the taste and nutrition of dairy foods.

## Dairy Consumption

**Idea:** Check out Nutrition Explorations at [www.nutritionexplorations.org](http://www.nutritionexplorations.org) for fun food games from the National Dairy Council and Kids Nutrition at [www.ext.nodak.edu/food/kidsnutrition/](http://www.ext.nodak.edu/food/kidsnutrition/) from the NDSU Extension Service.

**Idea:** Have students play the MyPyramid Blast-off game at the U.S. Department of Agriculture's [www.MyPyramid.gov](http://www.MyPyramid.gov) under Kids 6-11 years.

**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  
Plastic jar or container  
Salt  
Crackers

### 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.

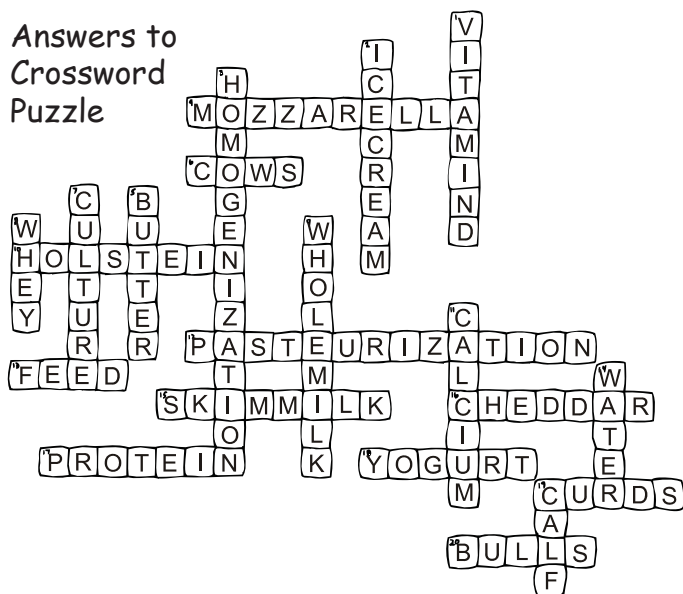
Children should knead the bags about 10 minutes. When a soft ice cream is formed, give spoons to eat out of the bag.

**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.

### Answers to Cheese around the World



Answers to  
Crossword  
Puzzle



**Dairy Reading Suggestions for Ages 6-10**

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

Dairy Cows: A New True Book by Kathy Henderson, Chicago Children's Press

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](http://www.midwestdairy.com)

Find recipes, health news, nutrition learning tools, dairy facts and dairy farmer profiles. A variety of lesson plans and activity ideas are under the Ag in the Classroom portion of the Schools section.

[www.dairyfarmingtoday.org](http://www.dairyfarmingtoday.org)

Take a virtual tour of a dairy farm and learn how wholesome dairy products come to your table.

**From Farm to Food to You poster** – order # IR104

22x28 poster showing the journey milk takes from the farm to your table.

**From Farm to Food to You tearpad, 50 sheets/pad** – order # IR103

Handout with puzzles, trivia and information about the journey of milk from the farm to the table.

**From Farm to Food to You bookmark** – order # IRBP03

To order poster, tearpad or bookmark, call (877) 487-5033, fax Midwest Dairy Council, c/o Inland Marketing at (877) 228-7869 or e-mail [MDA@inlandprinting.com](mailto:MDA@inlandprinting.com)

**North Dakota Dairy Princess** – The North Dakota Dairy Princess is available to visit your school to give an informative presentation on "From Farm to Food to You." She shows students the path milk takes from the farm to the table, talks about the care of dairy cows, explains how milk is transferred and hauled to the dairy plant, and reminds students of the nutritional value of dairy foods. If you are interested in having the ND Dairy Princess come to your school, contact Midwest Dairy Association at (800) 406-6455.

To contact your local Dairy Council representative, call (800) 406-MILK (6455) or visit [www.midwestdairy.com](http://www.midwestdairy.com).

# North Dakota Agriculture in the Classroom Activities

This **Ag Mag** is just one of the North Dakota Agriculture in the Classroom Council projects. 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's 55 lessons include:

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

For information, contact:

Gail Scherweit-Bakko  
N.D. Farm Bureau Foundation  
(701) 298-2219  
gails@ndfb.org

Since teachers must relate work to education standards, the council worked with North Dakota State University to identify which Project Food, Land & People lessons meet North Dakota's **academic standards** for grades K-8. The North Dakota Agriculture in the Classroom Web site at **www.ndaginclassroom.org** includes links to these standards alignments, educational materials, statistics, resources and activities for students and teachers.

For information, contact:

Bob Christman  
N.D. Department of Agriculture  
(800) 242-7535  
ndda@nd.gov

Educators may apply for **mini-grants for up to \$500** for use in programs that promote agricultural literacy. The Agriculture in the Classroom Council, working with the N.D. FFA Foundation, offers these funds for agriculture-related projects, units and lessons used for school-age children. The mini-grants fund hands-on activities that develop and enrich understanding of agriculture as the source of food and/or fiber in our society. 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 are welcome to apply.

Examples of programs that may be funded: farm safety programs, agricultural festivals, an elementary classroom visiting a nearby farm and ag career awareness day. Grant funds can be used for printing, curriculum, guest speakers, materials, food, supplies, etc. More ideas and an application are at **www.ndaginclassroom.org**.

For information, contact:

Beth Bakke Stenehjem  
N.D. FFA Foundation  
(701) 224-8390  
bethbakke@btinet.net

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

**Agricultural Science in the Virtual Classroom** is a project in which middle school and high school science classes are paired with North Dakota State University agriculture faculty and North Dakota ag industry leaders. The pairs use videoconferencing, Web pages and other technologies to share knowledge about biofuels, food safety and similar ag topics.

For information, contact:

Kim Owen  
NDSU Information Technology Services  
(701) 231-9522  
kim.owen@ndsu.edu

## **North Dakota Agriculture in the Classroom Council**

Doug Goehring – N.D. Agriculture Commissioner  
Wayne Sanstead – N.D. Superintendent of Public Instruction  
Doug Vannurden – N.D. Dept. of Career and Technical Education (retired)  
Judge Barth – Dakota Pride Cooperative, Jamestown  
Kim Alberty – Agassiz Seed and Supply, West Fargo  
Ted Johnson – Kindred High School, Kindred  
Mary Lou Klemisch – Prairie View Elementary School, New Salem  
Ginger Deitz – Bennett Elementary School, Fargo  
Steven Edwardson – North Dakota Barley Council  
Shannon Berndt – Northern Pulse Growers Association  
Gary Hoffman – North Dakota Dairy Coalition  
Aggie Jennings – North Dakota Farmers Union, Washburn  
Jill Vigesaa – Project Food, Land & People, Fargo  
Darin Spelhaug – N.D. FFA President  
Kathy Holle – N.D. Dept. of Career and Technical Education  
Ward Eichhorst – North Dakota Farm Bureau, Coleharbor

### **Ex-officio:**

Gail Scherweit-Bakko – North Dakota Farm Bureau, Fargo  
Kim Owen – NDSU Information Technology Services, Fargo  
Becky Koch – NDSU Ag Communication, Fargo  
Beth Bakke Stenehjem – N.D. FFA Foundation, Bismarck  
Marilyn Weiser – North Dakota Geographic Alliance, Minot

## **N.D. Department of Agriculture Contact for Ag in the Classroom Council**

Bob Christman, Deputy Commissioner  
600 Boulevard Avenue, Dept. 602  
Bismarck, ND 58505-0020  
Phone: (701) 328-4758 or (800) 242-7535  
Fax: (701) 328-1870/4567  
ndda@nd.gov or bob.christman@nd.gov

