

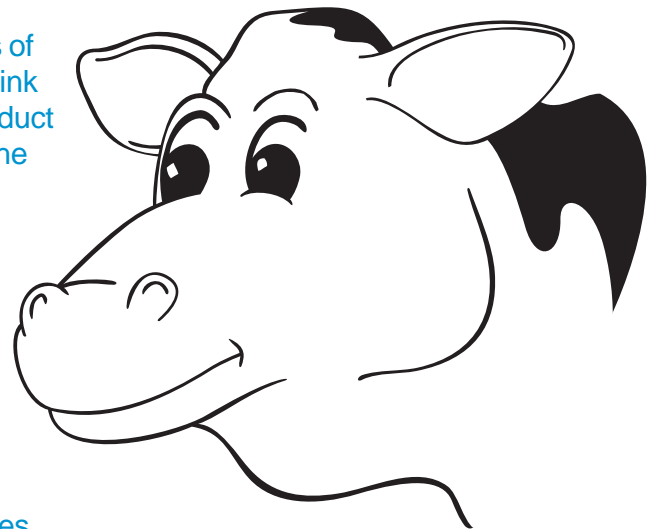
From Moo to You



The next time you drink a glass of milk or eat cheese or yogurt, think about the journey that dairy product has taken. How did it get from the cow to you?



Dairy Production



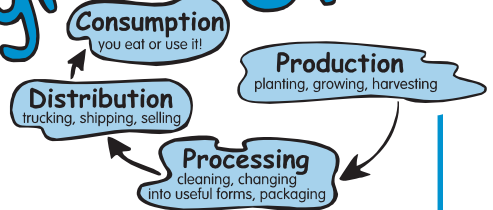
Incredible Dairy Facts

- All cows are female. The males are called bulls.
- A cow gives milk after she has given birth to a calf. She can have her first calf when she's about 2 years old.
- Milk is measured in pounds, and the average U.S. cow gives about 52 pounds (94 cups) of milk each day. That's 107,000 pounds (200,000 glasses) of milk in her lifetime – enough to fill the average classroom 2 feet deep with milk.
- Holsteins are one breed of dairy cattle. A Holstein cow's spots are like a fingerprint or snowflake. No two cows have exactly the same pattern of spots.
- Cows provide 90% of the world's milk, but water buffalo, camels, goats, sheep, horses and reindeer are also milked.



Agriculture! It's farming and ranching and much more. It's the production, processing, distribution and consumption of our food, fiber, forestry and fuel products.

Agriculture Cycle



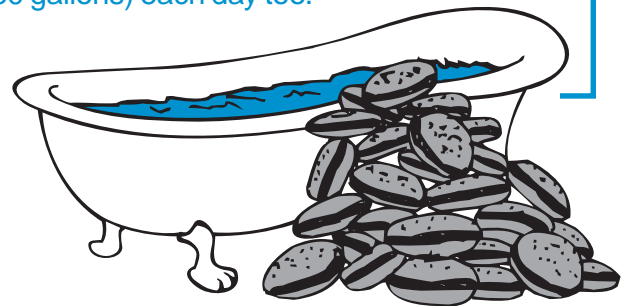
Moo Math

1. Even cows need a break. A cow can produce milk for about 300 of the 365 days in a year. If she produces 94 cups of milk per day, how many cups does she produce in 300 days? _____
2. Many of us buy milk in gallon jugs. How many gallon jugs can that cow fill in a day? _____
3. Before milking machines were invented in 1894, a farmer could milk 6 cows per hour by hand. How long would the milking take if the farmer had 15 cows? _____
4. Farmers can now milk a cow in 5 minutes or less with a milking machine. If a farmer has 6 milking machines going at once, how many cows can be milked in one hour? _____
5. There are nearly 10 million milk cows in the U.S. today, and about 90% of them are of the black and white Holstein breed. How many U.S. cows are Holsteins? _____

Eating Right

Cows eat grass, hay and grains such as corn, and they drink lots of water. The cow's body uses this feed and water to make milk. A well-fed cow produces an average of 25 pounds (45 cups) of milk in one milking. (They're usually milked twice a day.) If a cow eats only grass, she produces only about 13.3 pounds (24 cups) of milk in one milking. So you see, good nutrition pays off for cows as well as people!

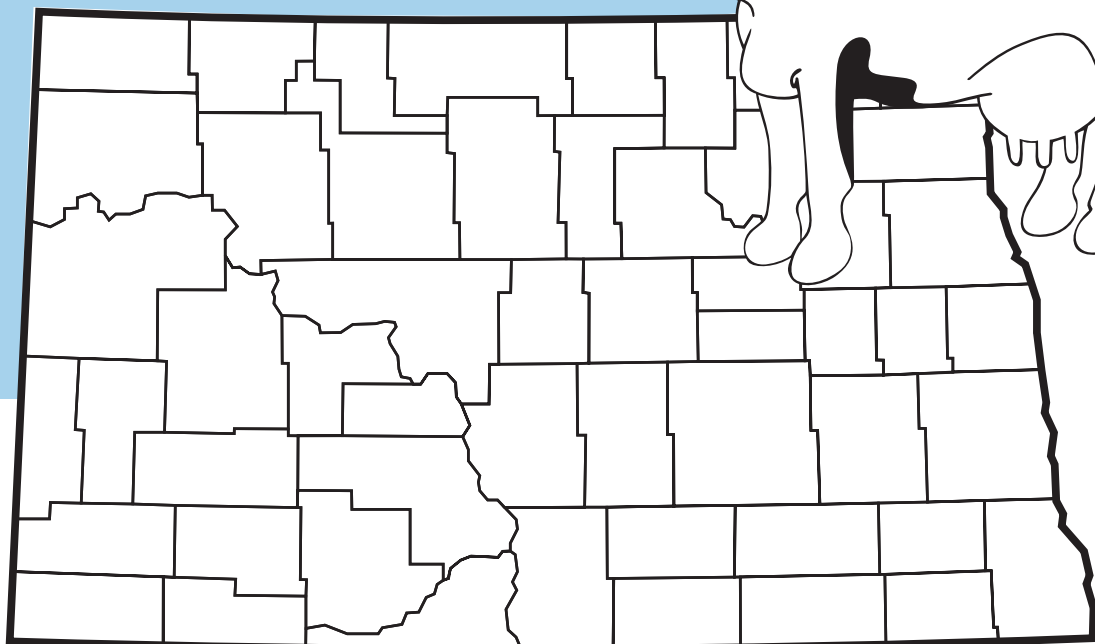
Can you imagine eating 480 hamburgers a day? These burgers would weigh about 90 pounds, and cows eat about 90 pounds of feed in a single day. They spent about 6 1/2 hours a day eating. Cows drink a bathtub full of water (25-30 gallons) each day too.



North Dakota's Dairy Cows

Dairy cows can be found across North Dakota. Use this map to identify the state's top 10 counties for number of dairy cows.

1. Morton
2. Emmons
3. Stark
4. Stutsman
5. McIntosh
6. McHenry
7. Oliver
8. LaMoure
9. Mountrail
10. Nelson



To learn more about dairy cows, check out www.moomilk.com.

Dairy Processing

At the Processing Plant

Milk samples are tested in a lab to ensure that only the purest milk is used. If it passes the tests, the milk is *homogenized* to break the butterfat particles into thin, uniform globules. If milk wasn't homogenized, the cream would rise to the top so you would have to shake or stir the milk before serving.

The milk is then *pasteurized*. That means it's heated to 161 degrees F for 15 seconds to kill bacteria, then rapidly cooled to prolong shelf life.

Some of the milk is packaged for drinking. Vitamin D and Vitamin A are added, and some has flavor added to make delicious chocolate or strawberry milk. Packaging machines fill and seal the cartons or jugs.

Almost half the milk produced in the U.S. is made into more than 200 different types of cheese.

List the different kinds of cheese you know.

List other dairy products you're familiar with.

How Much Milk Does It Take?

A tall, cool glass of milk isn't the only way to get milk's vitamins and calcium. You can get them in all kinds of different dairy products.

How many cups of milk does it take to make each of the products listed below? Draw a line from the food to your guess.

1 pound butter

8 ounces yogurt

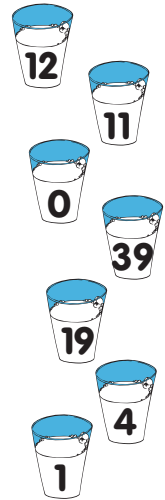
1/2 gallon ice cream

1 dozen eggs

1 pound cottage cheese

1 pound American cheese

2 cups evaporated milk



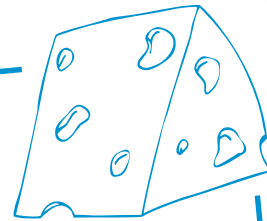
Say Cheese!

To make cheese, milk is heated and mixed with a *culture*. Cultures contain different types of good bacteria that give various cheeses their distinct flavors, textures and colors. The culture makes the milk curdle, clumping the milk's proteins together to form lumpy curds and liquid whey. (Remember Little Miss Muffet's snack?)

The whey is drained from the curds. You can eat the curds as fresh cheese, or you can wait until the curds are aged.

The kind of milk used, the amount of fat in the milk, how the curds and whey are formed, and how the cheese is stored also account for different colors and tastes. Even the sizes and shapes of cheeses are different.

Visit www.ilovecheese.com to learn all about cheese, especially the different kinds of cheeses and the history of cheese.

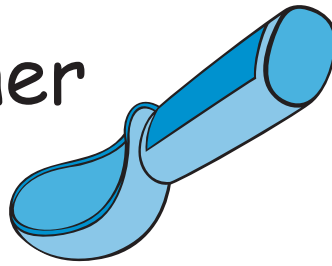


Find the Real Seal on genuine dairy products at home.

Career Corner

Marla Gaebe Hoff

Regulatory Affairs Specialist
The Schwan Food Company
Richardton, North Dakota,
and Marshall, Minnesota



of the Scientific and Regulatory Affairs department, we ensure that all food labels are accurate and not misleading, and meet the many government regulations in place for food labeling and advertising.”

Marla grew up on a dairy farm near New Salem, North Dakota. She enjoys working in the food industry.

“I got my bachelor of science degree in Food Science and Technology from North Dakota State University in 1993 with minors in Nutrition and Chemistry. This sounded like a major for me since I had an interest and aptitude for science and also enjoyed cooking and baking and understanding the science of food.

“I would recommend a degree in Food Science to others because there are a lot of opportunities from product development to quality assurance to sales and marketing. People always have to eat, so there will always be a need for new food products, especially more convenience food items people can eat on the run. This kind of work allows you to be creative and use your technical knowledge.”

So next time you eat a bowl of ice cream or read the Nutrition Facts panel on a food product, think about the behind-the-scenes people like Marla who helped make that possible.

What a job! Getting paid for eating ice cream.

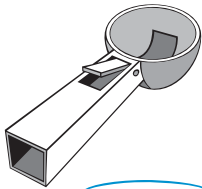
For 8½ years, Marla Gaebe Hoff worked as a food technologist in Schwan’s Frozen Desserts and Beverages Product Development group. They developed new flavors and product ideas for ice cream frozen desserts, ice cream novelties and beverages.

“This included making small batches of ice cream flavors, evaluating different ingredients, working with ingredient suppliers, writing formulas and specifications, developing labels and nutrition information, evaluating shelf life, and working with our production plants to produce new or improved products,” Marla said.

Some flavors that never made it into the product line-up: Tiger Stripes ice cream – orange ice cream with a licorice swirl, cherry cola-flavored ice cream, beer-flavored ice cream, ice cream with chocolate-covered tortilla chips and neon-colored ice cream.

When Marla and her husband moved back to North Dakota, she continued to work for Schwan’s, first as a consultant and now as an employee with a special work arrangement that allows her to work from home.

“I work as a regulatory affairs specialist from Richardton, using the Internet to connect to the Schwan’s network. My main job responsibility involves developing the labeling information for Schwan’s food products. I create the Nutrition Facts panels you see on Schwan’s food products, which includes everything from pizza to egg rolls to ice cream. As part



Nutrition Facts	
Serving Size 1 cup	
Serving Per Container about 2	
Amount Per Serving	Calories from Fat 60
Calories 140	
	% Daily Value
Total Fat 7	13%
Saturated Fat 5g	20%
Trans Fat 0g	
Cholesterol < 6mg	2%
Sodium 40mg	4%
Total Carbohydrate 28g	12%
Dietary Fiber < 1g	3%
Sugars 18g	
Protein 2g	
Vitamin A 2%	Vitamin C 3%
Calcium 8%	Iron 1%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs

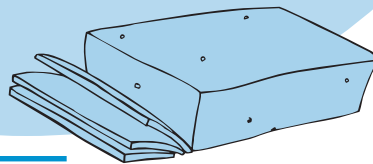
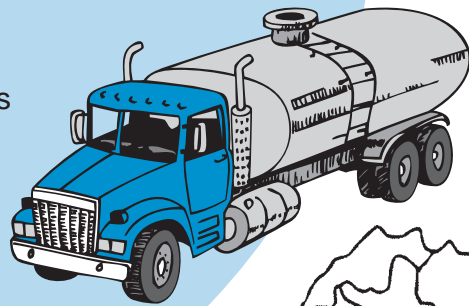
Dairy Distribution

Milk is processed and distributed quickly so it's fresh when you buy it. The milk that arrives at the store today was milked from cows just two days ago.

The Journey of Milk

Milk travels through many steps from the farm to your table. Think about milk production, processing, distribution and consumption to number these steps 1-9 in the order in which they happen.

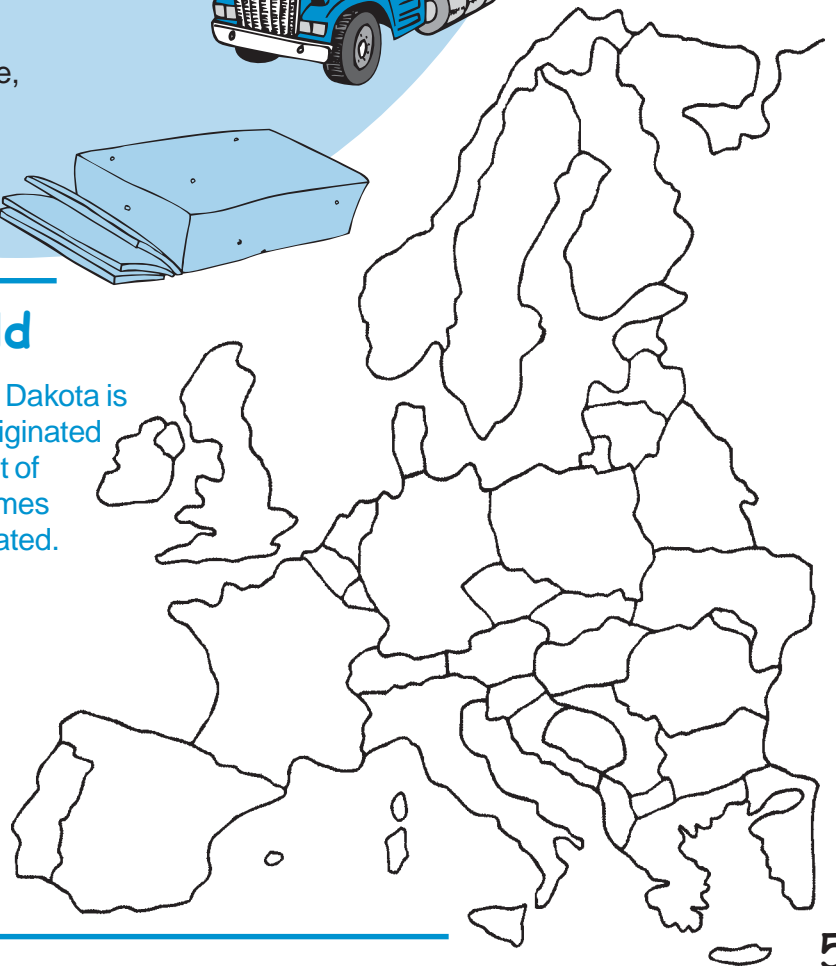
- ___ The milk is tested for quality and homogenized and pasteurized if it's to be sold as liquid milk.
- ___ Cows are milked 2 or 3 times each day.
- ___ You enjoy the taste and nutrition of dairy foods.
- ___ Some of the milk is processed into cheese, yogurt, ice cream and other dairy products.
- ___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



Cheese Around the World

More than half of the milk produced in North Dakota is made into cheese. Many cheese varieties originated in Europe. On a world map, find the continent of Europe. On this European map, write the names of the countries where these cheeses originated.

- Mozzarella, Provolone, Parmesan – Italy
- Brie, Camembert – France
- Feta – Greece
- Cheddar – England
- Swiss, Gruyère – Switzerland
- Havarti – Denmark
- Jarlsberg – Norway
- Gouda, Edam – The Netherlands
- Limburger – Belgium



Dairy Consumption

Are You Calcium Smart?

Your body needs calcium for strong bones and teeth. The best way to get calcium is from milk and other dairy foods. The new MyPyramid for Kids at www.mypyramid.gov says you need 3-A-Day of Dairy.



Milk Group

Get your calcium-rich foods

One serving equals 1 cup of milk or yogurt, 2 ounces of cheese, or 1/2 cup of cottage cheese, pudding, ice cream or frozen yogurt.

List the foods you ate from the milk group today and yesterday.



What's in Those Cartons?

Confused by whole, reduced-fat, low-fat and fat-free? These labels on milk cartons tell you how much fat is in the milk. Whole milk, as it comes from the cow, is usually about 3.25% fat naturally. That means if the milk was not homogenized and the fat or cream could rise to the top, 3.25% of the total amount of milk you poured would be cream. That's about 1 1/2 tablespoons of cream in each 8-ounce glass of milk.

Reduced-fat milk has 2% fat, low-fat milk has just 1% fat left in it and fat-free milk has no fat. All milk – whole or fat-free, flavored or white – contains the same amount of important vitamins and minerals.

Got Milk?

Take a look at the nutrients in dairy products and what they do for you.

Calcium – helps build strong bones and teeth

Magnesium – involved in building bones, building muscles and muscle movement

Phosphorus – a major part of bones and teeth

Potassium – regulates water balance in your body and blood pressure

Protein – helps build strong muscles

Riboflavin – helps change food to energy

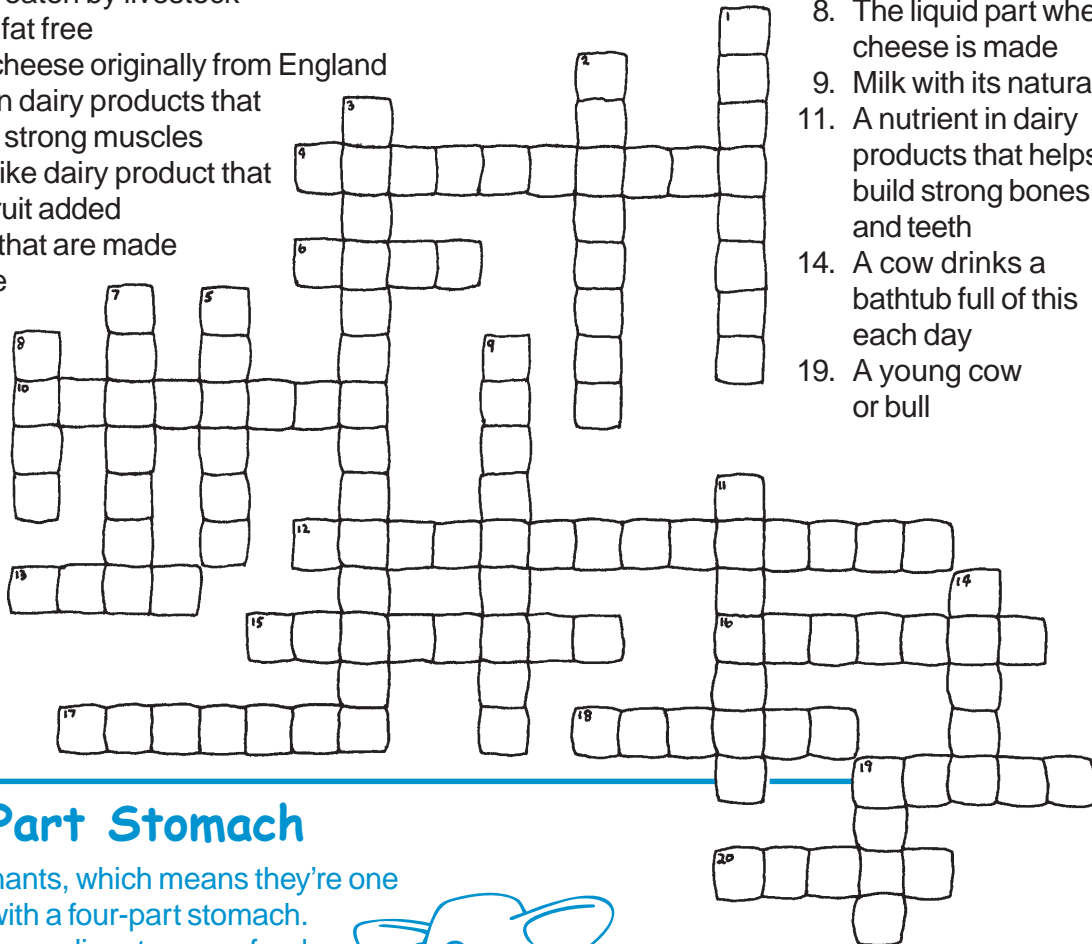
Vitamin B12 – builds red blood cells that carry oxygen to muscles

Vitamin D – helps your body use calcium to build strong bones and teeth

Crossword Puzzle

Across

4. Italian cheese used on pizza
6. Female cattle that produce milk
10. The black and white breed of dairy cattle
12. Heating to 161 degrees F for 15 seconds to kill bacteria
13. The grains eaten by livestock
15. Milk that is fat free
16. A popular cheese originally from England
17. A nutrient in dairy products that helps build strong muscles
18. A custard-like dairy product that often has fruit added
19. The solids that are made into cheese
20. Male cattle



Down

1. Added to drinking milk to help calcium build strong bones and teeth
2. A frozen dairy dessert
3. A process that breaks milk's butterfat particles
5. Cream is churned into this spread
7. The starter that helps produce yogurt and cheese
8. The liquid part when cheese is made
9. Milk with its natural fat
11. A nutrient in dairy products that helps build strong bones and teeth
14. A cow drinks a bathtub full of this each day
19. A young cow or bull

A Four-Part Stomach

Cows are ruminants, which means they're one of the animals with a four-part stomach. That's why they can digest coarse feeds like hay that other animals and people can't eat. It's also why they can swallow their food quickly without chewing it well.

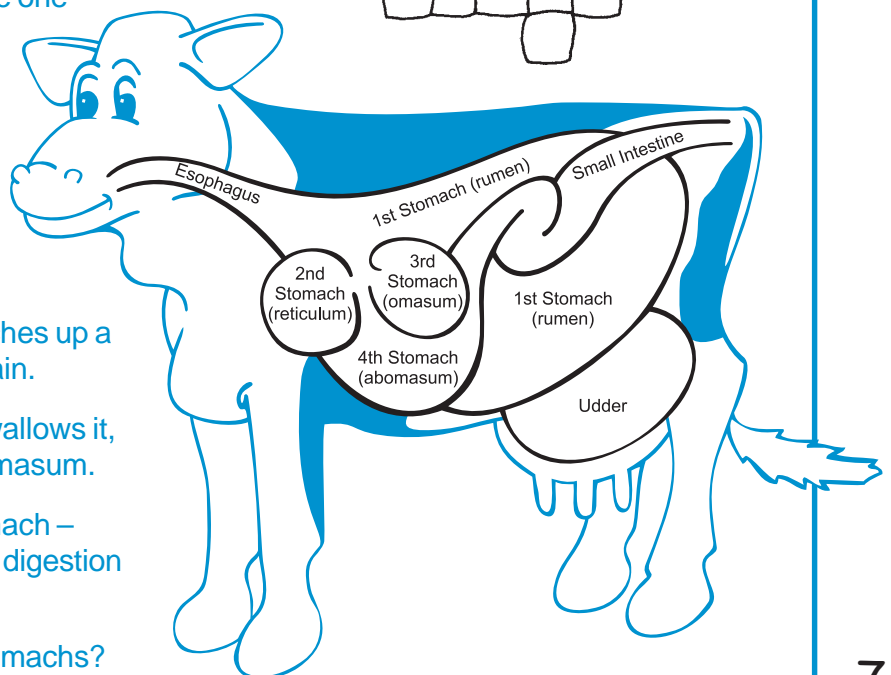
The food goes into the first and second stomachs – the rumen and reticulum.

When the cow has eaten her fill, she belches up a small amount of food – cud – to chew again.

After chewing her cud thoroughly, she swallows it, and it goes into the third stomach – the omasum.

From there it moves on to the fourth stomach – the abomasum – the true stomach where digestion actually occurs.

Can you trace the path through all the stomachs?



North Dakota
Agriculture
in the
Classroom



Take this
issue of
North
Dakota
Ag Mag
home to
share what
you've learned
about dairy.

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N.D. Department of Agriculture
600 E. Boulevard Ave., Dept. 602
Bismarck, ND 58505-0020

Voice: (701) 328-2231
Toll-free: 1-800-242-7535
Fax: (701) 328-4567

E-mail: ndda@state.nd.us
Web: www.agdepartment.com

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Fruit Cow

1 cup yogurt
1 cup milk
1 cup fruit (banana slices, berries, your choice!)

Put ingredients in a blender. Blend until smooth
and creamy. Pour into a tall glass and drink up!