Water Wise

Dear Educator,

Water and milk are important partners in dairy farming; in fact, milk is 90 percent water. Only about 1 percent of the Earth's fresh water is suitable for human, plant, and animal use, so conserving water in dairy farming is as important a goal for farmers as it should be for your students and their families — because we all share the same local watershed, whether we live in a rural, suburban, or urban community.

This free educational program, created by the American Dairy Association North East (ADANE) in cooperation with the curriculum specialists at Young Minds Inspired (YMI), uses standards-based activities that support the science and health curriculum to help students in grades 2-4 learn how local dairy farmers conserve water on their farms, and how they and their families can conserve water at home.

We hope that you will share these materials with other teachers in your school. Although the materials are copyrighted, you may make as many copies as needed for educational purposes. Please use the enclosed reply card or comment online at ymiclassroom.com/feedback-adane-water to provide feedback. We look forward to hearing from you.

Sincerely,

Richard C Naczi

Rick Naczi
CEO
American Dairy Association North East

Dr. Dominic Kinsley
Editor in Chief
Young Minds Inspired

For questions, contact us toll-free at 1-800-859-8005 or by email at feedback@ymiclassroom.com.

AMERICAN DAIRY ASSOCIATION NORTH EAST

Target Audience

Elementary school students in grades 2-4 and their parents or guardians.

Program Objectives

- Help students learn about water conservation practices employed in modern dairy farming.
- Encourage students and families to learn more about actions they can take to conserve water at home.
- Remind students how milk's nutrition supports healthy growth and development.

Program Components

- This one-page teacher's guide.
- Three reproducible activity sheets.
- A colorful classroom wall poster.
- A reply card for your comments, or comment online at ymiclassroom.com/feedback-adane-water.

How to UseThis Program

Photocopy the teacher's guide and activity sheets before displaying the poster. Schedule the activities and have students take their sheets home to share with a parent or guardian. Display the poster prominently and refer to it often, especially in helping students complete Activity 2. To review program alignment with Common Core and national standards, visit ymiclassroom.com/adane-water.

Activity 1 Water: Going With the Flow

Part 1: Help students read and interpret the flow chart before completing the sentences. ***Answers:*** 1. the plate cooler; 2. the plate cooler; 3. to mist cows for comfort, wash farm equipment, and wash away manure and debris; 4. separator; 5. recycled for cow bedding; used to fertilize the fields. (Answers for questions 4 and 5 are found on the poster under *Recycle*.)

Part 2: Remind students that, although they can't really "see" the watershed, it is a crucial resource in every community, and everyone has a responsibility to protect it. Have students unscramble the words that describe ways in which dairy farmers protect the watershed. ***Answers:*** 1. cover crops; 2. riparian buffers; 3. low/no-till farming.

Activity 2 Water: Managing the Flow

Part 1: Call on student volunteers to help set up this class experiment on the water cycle before distributing the activity sheets. You will need a one-gallon zip-close bag, blue food coloring, a 6-8 oz. plastic cup, water, a permanent marker, and construction or blank paper for student posters.

Use the permanent marker to draw a "sun" in the upper right corner of the bag, a few "clouds" below it, and the "ocean" at the bottom. Add 1-2 drops of food coloring to a cup of water in the bag and close it tightly, then secure it with tape to a bright window and observe it for a few days.

As the sun heats the water, some water droplets will collect near the "clouds" (evaporation), while others will fall to the "ocean" as precipitation. In nature, the evaporated water would escape into the atmosphere, but in the bag it can only condense and continue to "rain" down, as in the water cycle.

Distribute the activity sheets and have students work independently or in small groups to label and define the processes in the illustration. ***Answers:*** 1. Condensation; 2. Precipitation; 3. Transpiration; 4. Evaporation

Part 2: Direct students to first use the poster as a reference to learn how dairy farmers conserve water. In addition to the practices listed, dairy farmers also plant cover crops, create riparian buffers, and use low/no-till farming methods.

Have students refer to the tips on the poster, under *What You Can Do*, for ideas on how to conserve water at home, and share ideas in a class discussion. Then have student partners create posters illustrating different water conservation actions. Display student work in the classroom as an ongoing call to action for water conservation.

Activity 3 Water: Supporting Dairy Nutrition

Distribute the activity sheets and review directions aloud with students. Students may work independently or in small groups to determine answers: **Part 1:** 1. C; 2. A; 3. B.
Part 2: Calcium: 23%, cross out B;
Vitamin D: 15%, cross out C;
Phosphorus: 20%, cross out A;
Riboflavin: 31%, cross out C;
Protein: 16%, cross out C;
Vitamin B-12: 50%, cross out A;
Pantothenic Acid: 19%, cross out B;
Vitamin A: 15%, cross out C;
Niacin: 10%, cross out B.

Resources

- ymiclassroom.com/adane-water
- American Dairy Association North East: americandairy.com

Reproducible Master

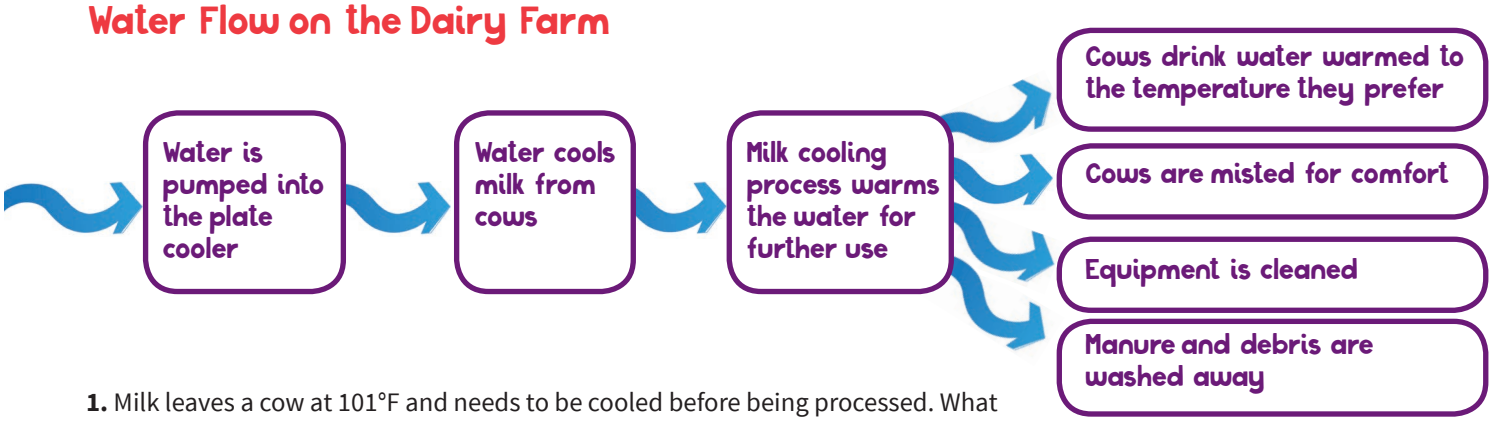
Activity 1

Water: Going With the Flow

America's dairy farmers work hard to reduce the amount of water needed to produce a glass of milk. They have many ways to conserve the water used on a dairy farm.

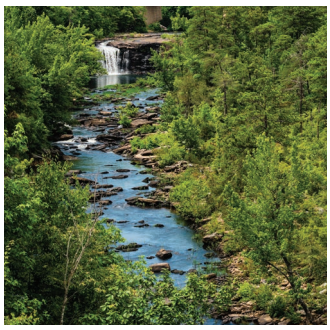
Part 1: Look at this water flow diagram and read the poster. Then put on your dairy farmer's thinking cap to answer the questions below.

Water Flow on the Dairy Farm



1. Milk leaves a cow at 101°F and needs to be cooled before being processed. What piece of equipment cools the milk? _____
2. Cows prefer warm water! What piece of equipment warms their drinking water to the 75°F temperature they prefer? _____
3. Warmed water coming from the plate cooler is also used in other ways on the dairy farm. Name two: _____ and _____
4. Water that contains manure goes to a _____
5. The separator allows solids to be _____ and liquids to be _____

Dairy farmers use self-refilling bowl and trough systems so their cows always have fresh water whenever they want, minimizing waste!



Part 2: A watershed is the area where fresh water flows from higher elevations into a common body of water, such as a river, stream, or lake. When water and soil are contaminated, pollutants travel throughout the entire watershed. Unscramble these words to learn how dairy farmers help protect the watershed for all of us.

1. cover procs __ __ o __ __

A type of crop grown not for food but to protect the soil from erosion. The root structures of these crops add nutrients to the soil and help the soil hold water longer, meaning less watering is needed to raise food crops.

2. riparian fsfrbue __ __ f __ __ __ s

Created by planting trees, shrubs, and other plants in areas next to water sources, these protect the water from pollution run-off while providing habitat for wildlife. The word *riparian* means "relating to river banks."

3. owl/on-litl farming

__ __ w/ __ o-__ __ l __

A method of planting crops that does not require digging deeply into the soil, if at all. Crops are planted in between remains of past plantings. This practice helps increase the amount of water that enters the soil.

Local milk is available 365 days a year.

Activity 2

Water: Managing the Flow

Part 1: Recycling water is an important part of the dairy farmer's water management strategy. Dairy farmers — and all of us — have help from Earth's water cycle, a natural recycling process you saw demonstrated in class.

Use the word bank below to label each stage of the water cycle. Then write definitions for each word on the lines provided. You can use a dictionary or the Internet to find definitions.

Water Cycle Word Bank

Condensation: _____

_____

Precipitation: _____

_____

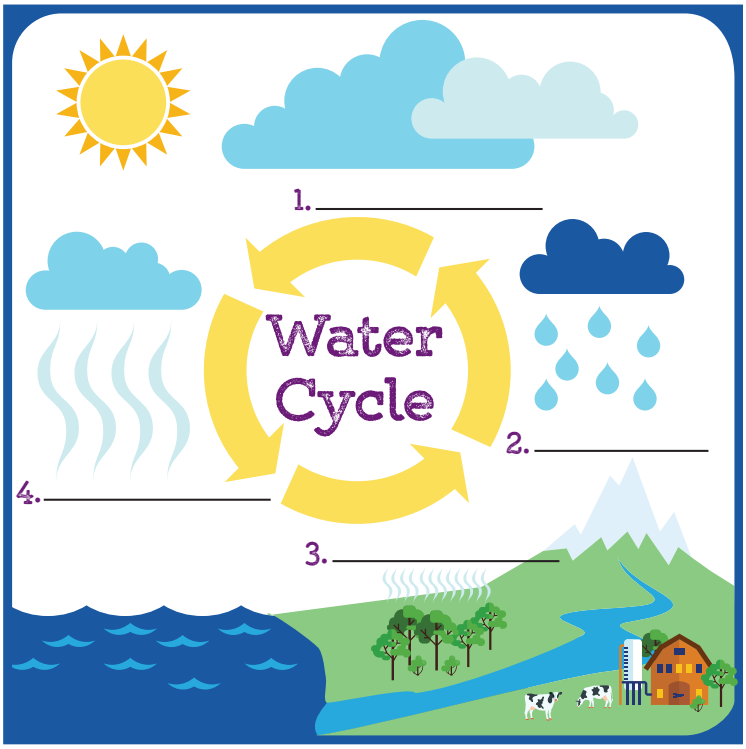
Transpiration: _____

_____

Evaporation: _____

_____

_____



Part 2: Everyone has a role to play in protecting the watershed and conserving water. Dairy farmers are doing their part. Are you doing yours? Look at the poster to find ways that dairy farmers manage water use. Then use this space to list some ways that you and your family can practice water conservation at home.

How My Family Can Conserve Water

_____

_____

_____

_____

_____

_____

_____

_____

_____

Now work with a classmate to create a poster that illustrates one of the water conservation actions you listed.

Local milk is available 365 days a year.

Get water wise!

Visit www.watercalculator.org with your parents to help your family calculate your average monthly water usage and create a family plan for saving water!

Reproducible Master

Activity 3

Water: Supporting Dairy Nutrition

Part 1: Cows need fresh water every day to produce nutritious milk for you to enjoy. Fill in the correct number below to complete each sentence and learn more.

A. 75 B. 35 C. 90

1. Cow's milk is _____ percent water.
2. Cows prefer to drink water at a temperature of _____°F.
3. A dairy cow drinks approximately _____ gallons of water a day, about the amount in a bathtub full of water.

Milk contains 9 essential nutrients. Your body cannot produce these nutrients by itself. You must get them in your diet. That makes milk a top choice for great nutrition!

Part 2: Milk is full of amazing nutrients your body needs to grow strong and healthy. Just compare the nutrients in fat-free milk with the nutrients in fruit punch. In this chart, the "% Daily Value" columns tell you what percentage of your daily requirement for each nutrient is provided by an 8-oz. serving of that beverage. For example, an 8-oz. serving of fat-free milk provides 16 percent of the total amount of protein you need *each day*. Use your math skills to calculate the difference in "% Daily Value" for each nutrient listed in the chart, and write your answers in the blank spaces.

Do you know what milk's nutrients do for you? Review the benefits listed next to each nutrient. Two are correct. Cross out the incorrect one.

	% Daily Value		Difference in % of Daily Value			
Nutrients	**Fat-Free Milk**	**Fruit Punch**		**Benefits For Your Body**		
Calcium	25%	2%	_____	A. strong bones	B. more energy	C. strong teeth
Vitamin D	15%	0%	_____	A. strong teeth	B. strong bones	C. better digestion
Phosphorus	20%	0%	_____	A. improves hearing	B. strong bones and teeth	C. supports tissue growth
Riboflavin	35%	4%	_____	A. helps turn fats into fuel	B. helps turn protein into fuel	C. helps turn vitamins into fuel
Protein	16%	0%	_____	A. builds muscle tissue	B. repairs muscle tissue	C. improves sleep
Vitamin B-12	50%	0%	_____	A. sharper vision	B. healthy nervous system	C. helps blood function
Pantothenic Acid	20%	1%	_____	A. helps turn carbohydrates into fuel	B. helps turn minerals into fuel	C. helps turn fats into fuel
Vitamin A	15%	0%	_____	A. healthy eyes	B. healthy skin	C. reduces stomach aches
Niacin	10%	0%	_____	A. used for energy metabolism	B. builds strong muscles	C. helps keep body energized

Local milk is available 365 days a year.

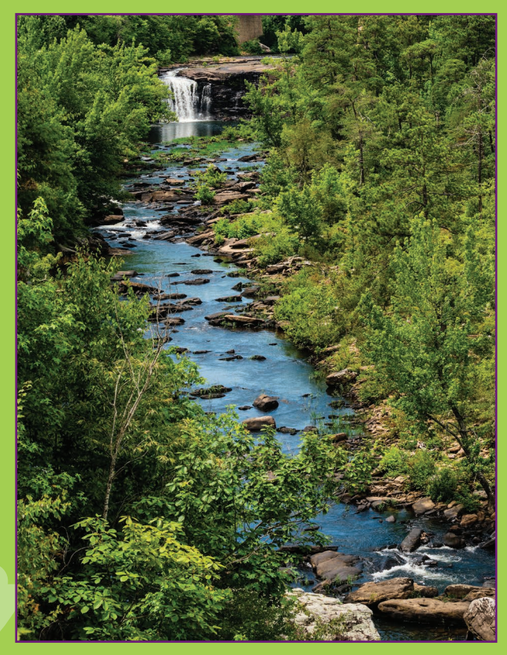
YOUR MILK COMES FROM A GOOD PLACE

AMERICAN DAIRY ASSOCIATION NORTH EAST

YMI YOUNG MINDS INSPIRED

Water Wise

Watersheds are important sources of fresh water, whether the water is used on a dairy farm or in homes and schools in rural, suburban, and urban communities. Learn how you can join dairy farmers in protecting your watershed.



1. Reduce

WHAT DAIRY FARMERS DO

Dairy farmers are experts at practicing water conservation. Over the past 60 years, they have reduced the amount of water used to produce each gallon of milk by 65 percent. That's thanks to improvements like watering systems that let cows drink whenever they want so there is almost no waste!

WHAT YOU CAN DO

- Turn off faucets tightly to avoid wasteful drips.
- Take short showers rather than baths.
- Run full loads for washing machines and dishwashers.
- Install low-flow showerheads.
- Turn water off when brushing teeth or soaping hands.

2. Re-use

WHAT DAIRY FARMERS DO

Milk from a cow is warm, about 101°F. To cool the milk for processing, dairy farmers use a *plate cooler*. Cold water passes through the plate cooler in one direction and absorbs heat from the warm milk as it passes in the opposite direction. Dairy farmers re-use this water as drinking water for their cows, who prefer warm water. The warmed water is also used for misting cows with a fine spray, cleaning farm equipment, and washing away manure and debris.

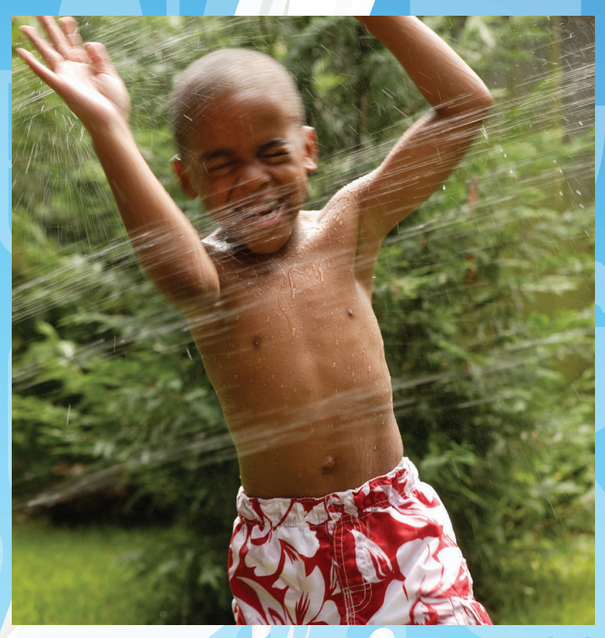
WHAT YOU CAN DO

- Wash fruits and veggies in a pan of water that can be re-used to water plants instead of rinsing them under running water.
- Pour the old water from your pet's water dish onto a plant before refilling it.
- Pour leftover bottled water onto a plant before recycling the bottle.

3. Recycle

WHAT DAIRY FARMERS DO

Water used to wash away manure and debris goes to a *separator*, which removes the water from the solid waste. That water is used to fertilize farm fields. It contains important nutrients that help crops grow while using less groundwater. The solids are recycled for cow bedding.



WHAT YOU CAN DO

- Use the cooled water from cooking veggies or pasta to water plants.
- If you play in the water sprinkler in the summer, be sure the spray is also hitting the lawn or gardens, and not concrete surfaces.
- Plant a rain garden. See www.cbf.org/document-library/education-resources/rain_garden_guide-web6fb5.pdf to learn more.
- Suggest to your parents or guardians that they divert greywater (gently used water from sinks, showers, tubs, and washing machines) from polluting the watershed by using it to water home gardens or plants.

Local milk is available 365 days a year.

YOUR MILK COMES FROM A GOOD PLACE

AMERICAN DAIRY ASSOCIATION NORTH EAST