

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 United Dairy Industry of Michigan 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 let us know your thoughts on this program by visiting ymiclassroom.com/feedback-milkmeansmore. We look forward to hearing from you.

Sincerely, Youth Wellness Team at United Dairy Industry of Michigan

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.

MORE waters 3. low/

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

Available at ymiclassroom.com/milkmeansmore:

- This one-page teacher's guide
- Three reproducible activity sheets
- A colorful classroom wall poster
- A feedback form

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 standards alignment, visit ymiclassroom.com/milkmeansmore.

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 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/milkmeansmore
- United Dairy Industry of Michigan: milkmeansmore.org

Adapted from a program developed by American Dairy Association North East 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

Water is pumped into the plate cooler Water cools milk from cows Milk cooling process warms the water for further use Cows drink water warmed to the temperature they prefer

Cows are misted for comfort

Equipment is cleaned

Manure and debris are washed away

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 ___ 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. ri	parian	fsfrbue	f

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.



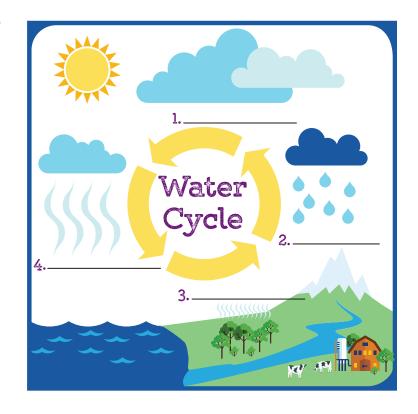


Part 1: Recycling water is an important part of the dairy farmer's water management strategy. Dairy farmers — and all of us — have help from Earth's water cycle, a natural recycling process you saw demonstrated in class.

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:

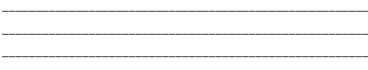




Part 2: Everyone has a role to play in protecting the watershed and conserving water. Dairy farmers are doing their part. Are you doing yours? Look at the poster to find ways that dairy farmers manage water use. Then use this space to list some ways that you and your family can practice water conservation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

How My Family Can Conserve Water

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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!



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









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.

C. 90

A. 75 B. 35

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.



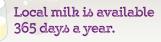
Milk contains
9 essential nutrients.
Your body cannot
produce these nutrients
by itself. You must get
them in your diet.
That makes milk a
top choice for
great nutrition!

Part 2: Milk is full of amazing nutrients your body needs to grow strong and healthy. Just compare the nutrients in fatfree 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				
Nutrients	Fat-Free Milk	Fruit Punch	Daily Value	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	









Educational Standards

GRADES 2-4	Activity 1	Activity 2	Activity 3
ENGLISH LANGUAGE ARTS ¹			
GRADE 2			
Speaking & Listening: Comprehension and Collaboration 1. Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.	Х	х	х
Reading Informational Text: Key Ideas and Details 1. Ask and answer questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.	х	х	Х
Reading Informational Text: Key Ideas and Details 3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.	Х	х	х
Reading Informational Text: Craft and Structure 4. Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.		х	
Reading Informational Text: Craft and Structure 5. Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.	Х	Х	
Reading Informational Text: Integration of Knowledge and Ideas 7. Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.	х	х	
GRADE 3			
Speaking & Listening: Comprehension and Collaboration 1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.	Х	х	х
Reading Informational Text: Key Ideas and Details 1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	х	х	Х
Reading Informational Text: Key Ideas and Details 3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.	Х	Х	Х

		I	
Reading Informational Text: Craft and Structure			
4. Determine the meaning of general academic and domain-specific		x	
words and phrases in a text relevant to a grade 3 topic or subject		,	
area.			
Reading Informational Text: Craft and Structure			
5. Use text features and search tools (e.g., key words, sidebars,	Х	Х	
hyperlinks) to locate information relevant to a given topic efficiently.			
Reading Informational Text: Integration of Knowledge and Ideas			
7. Use information gained from illustrations (e.g., maps, photographs)	х	x	x
and the words in a text to demonstrate understanding of the text	Α	^	^
(e.g., where, when, why, and how key events occur).			
GRADE 4			
Speaking & Listening: Comprehension and Collaboration			
1. Engage effectively in a range of collaborative discussions (one-on-			
one, in groups, and teacher-led) with diverse partners on grade 4	Х	Х	X
topics and texts, building on others' ideas and expressing their own			
clearly.			
Reading Informational Text: Key Ideas and Details			
1. Refer to details and examples in a text when explaining what the	Х	Х	X
text says explicitly and when drawing inferences from the text.			
Reading Informational Text: Key Ideas and Details			
3. Explain events, procedures, ideas, or concepts in a historical,	v	.,	
scientific, or technical text, including what happened and why, based	Х	X	X
on specific information in the text.			
Reading Informational Text: Craft and Structure			
4. Determine the meaning of general academic and domain-specific		Х	
words or phrases in a text relevant to a grade 4 topic or subject area.			
Reading Informational Text: Craft and Structure			
5. Describe the overall structure (e.g., chronology, comparison,	Х	Х	
cause/effect, problem/solution) of events, ideas, concepts, or	^	^	
information in a text or part of a text.			
Reading Informational Text: Integration of Knowledge and Ideas			
7. Interpret information presented visually, orally, or quantitatively			
(e.g., in charts, graphs, diagrams, time lines, animations, or	X	Х	X
interactive elements on Web pages) and explain how the information			
contributes to an understanding of the text in which it appears.			

GRADES 2-4	Activity 1	Activity 2	Activity 3
MATH STANDARDS ²			
GRADE 2			
Operations and Algebraic Thinking 2.OA: Add and subtract within 20.			Х
Pluently add and subtract within 20 using mental strategies. Number and Operations in Base Ten 2.NBT: Use place value understanding and properties of operations to add and subtract. 5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship			Х
between addition and subtraction. GRADE 3			
Number and Operations in Base Ten 3.NBT: Use place value understanding and properties of operations to perform multi-digit arithmetic. 2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.			х
GRADE 4			
Number and Operations in Base Ten 4.NBT: Use place value understanding and properties of operations to perform multi-digit arithmetic. 4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.			Х

GRADES 2-4	Activity 1	Activity 2	Activity 3
SCIENCE STANDARDS ³			
K-2-ETS1-1 Engineering Design			
Ask questions, make observations, and gather information about a			
situation people want to change to define a simple problem that	Х	X	
can be solved through the development of a new or improved			
object or tool.			
2-ESS2-1 Earth's Systems: Processes that Shape the Earth			
Compare multiple solutions designed to slow or prevent wind or	X	X	
water from changing the shape of the land.			
2-ESS2-3 Earth's Systems: Processes that Shape the Earth			
Obtain information to identify where water is found on Earth and	X	X	
that it can be solid or liquids.			
3-5-ETS1-1 Engineering Design			
Define a simple design problem reflecting a need or a want that	X	X	
includes specified criteria for success and constraints on materials,	^	^	
time, or cost.			
3-5-ETS1-2 Engineering Design			
Generate and compare multiple possible solutions to a problem			
based on how well each is likely to meet the criteria and constraints	X	X	
of the problem.			

3-LS4-4 Interdependent Relationships in Ecosystems			
Make a claim about the merit of a solution to a problem caused	V	v	
when the environment changes and the types of plants and animals	^	^	
that live there may change.			

GRADES 2-4	Activity 1	Activity 2	Activity 3
NATIONAL HEALTH STANDARDS ⁴			
Standard 1			
Students will comprehend concepts related to health promotion			
and disease prevention to enhance health.			
Grade 2			
 1.2.1 Identify that healthy behaviors impact personal health. 			
 1.2.2 Recognize that there are multiple dimensions of health. 			X
Grades 3-4			
 1.5.1 Describe the relationship between healthy behaviors and personal health. 			
 1.5.2 Identify examples of emotional, intellectual, physical, and social health. 			
Standard 5			
Students will demonstrate the ability to use decision-making skills			
to enhance health.			
Grade 2			
 5.2.1 Identify situations when a health-related decision is needed. 			Х
Grades 3-4			
 5.5.5 Choose a healthy option when making a decision. 5.5.6 Describe the outcomes of a health-related decision. 			
Standard 7			
Students will demonstrate the ability to practice health-enhancing			
behaviors and avoid or reduce health risks.			
Grade 2			X
 7.2.1 Demonstrate healthy practices and behaviors to 			
maintain or improve personal health.			
Grades 3-4			
 7.5.1 Identify responsible personal health behaviors. 			

Sources:

- 1. Michigan Department of Education, Michigan K-12 Standards for English Language Arts, www.michigan.gov/documents/mde/MDE_ELA_Standards_599599_7.pdf
- 2. Michigan Department of Education, Michigan K-12 Mathematics Standards, https://www.michigan.gov/documents/mde/K-12 MI Math Standards REV 470033 7 550413 7.pdf
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- 4. Joint Committee on National Health Education Standards. (2007). *National Health Education Standards, Second Edition:*Achieving Excellence. Washington, D.C.: The American Cancer Society. Available at
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