



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 Dairy Council of Florida 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 2-5 learn how local dairy farmers conserve water on their farms, and how they and their families can conserve water at home. The *Water Wise* curriculum also provides a chance to introduce students to Florida industry.

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 comment online at ymiclassroom.com/feedback-fdf to provide feedback. We look forward to hearing from you.

Sincerely,


Michele Cooper, CEO,
Florida Dairy Farmers


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.



Adapted from a program developed by American Dairy Association North East

Target Audience

Elementary school students in grades 2-5 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
- Introduce students to Florida's dairy industry

Program Components

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

How to Use This 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 Florida standards (FL NGSSS), visit ymiclassroom.com/fdf.

Activity 1

Water: Going With the Flow

Part 1: Help students read and interpret the flow chart before completing the sentences. Ask students to think about and discuss how dairy farmers reduce water waste on a farm. **Answers:** 1. by flushing wastewater down the aisle; 2. cows drinking water; sanitizing/cleaning equipment; 3. separator; 4. recycled for cow bedding; used to fertilize the fields. (Answers for questions 1, 3, and 4 are found on the poster under Re-use and 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. aquifer; 2. riparian buffers; 3. low/no-till farming. Have students complete 3-2-1 after they finish Part 2. Ask them to write down 3 ways farmers protect the watershed, 2 important facts about the watershed, and 1 question they have about the watershed.

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. Point out the visual "clues" in the image to help students label the process. Ask students how the image helps them to better understand the process.

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 protect aquifers, 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 the answers: **Part 1:** 1. C-87; 2. A-10; 3. B-65.

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/fdf
- Undeniably Dairy: www.usdairy.com/news-articles/ask-a-dairy-farmer-how-do-farmers-reuse-water

Activity 1

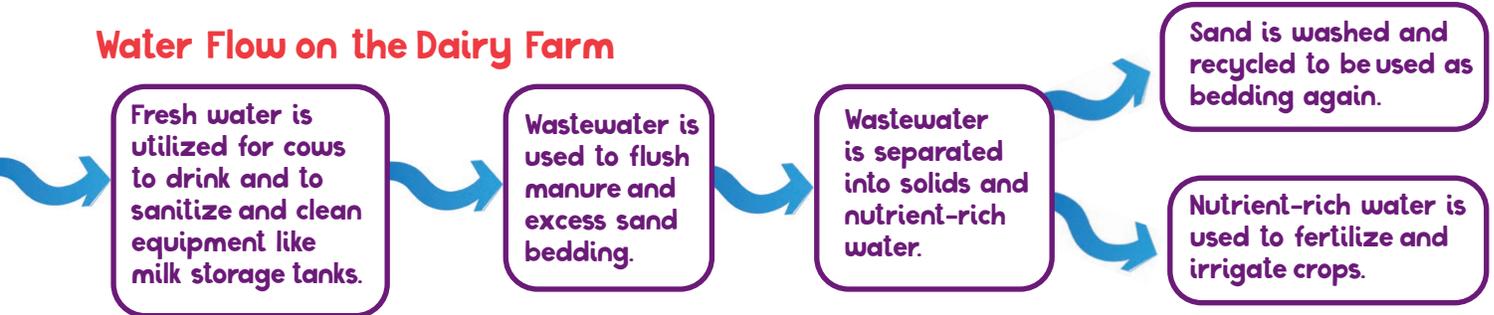
Water: Going With the Flow



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



- How do dairy farmers clean their barns? _____
- Name two ways fresh water is utilized on the dairy farm: _____ and _____
- Water that contains manure goes to a _____
- 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, lake, or aquifer. 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. arfquie ___ q ___ _ _ _ _ r

A body of permeable rock which can contain or transmit groundwater.

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

Reproducible Master

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.

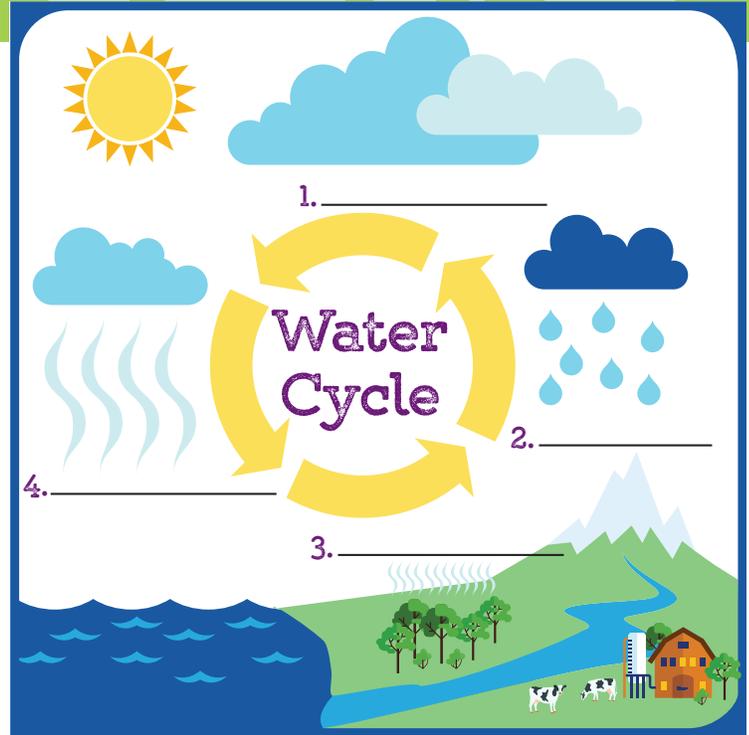
Water Cycle Word Bank

Condensation: _____

Precipitation: _____

Transpiration: _____

Evaporation: _____



Write a caption for this image using the Water Cycle Word Bank terms:



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.

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!



Local milk is available 365 days a year.





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. 10 B. 65 C. 87

- Cow's milk is _____ percent water.
- Dairy cows in Florida can produce up to _____ gallons of milk per day.
- Over the past 60 years dairy farmers have reduced the amount of water used to produce each gallon of milk by _____ percent.



Did you know that milk contains a unique combination of 9 essential nutrients that your body requires for good health? Milk is a top choice for great nutrition as part of an overall healthy diet!

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.

Use evidence from the chart to make a claim about which drink is healthier and why.

For more resources, refer to the Milk...More Than a Mustache poster at www.floridamilk.com/_resources/pdf/educational-materials/milk-more-than-mustache.pdf.

Nutrients	% Daily Value		Difference in % of Daily Value	Benefits for Your Body		
	Fat-Free Milk	Fruit Punch				
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. improves hearing
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.





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! Dairy cows in Florida can produce up to 10 gallons of milk per day.



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

Florida's dairy farms use fresh water for cows to drink and to sanitize and clean equipment like milk storage tanks. Farms clean barns by running water down the aisles in a similar way that people might hose off a driveway or deck. The water used to wash away manure and debris goes to a separator, which removes solid waste, leaving nutrient-rich water behind.



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

The nutrient-rich water is used to fertilize farm fields. It contains important nutrients that act as a fertilizer to help crops grow while using less groundwater. These crops are then harvested and used as feed for the cows. The sand is washed and recycled to be used as bedding again.



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.



Water Wise

Florida Standards Alignment

The activities in the *Water Wise* curriculum support the development of student understanding for the identified standards.

Grade 2 Standards Alignment	Activity 1	Activity 2	Activity 3
Florida B.E.S.T. English Language Arts			
ELA.2.R.2.1 - Explain how text features—including titles, headings, captions, graphs, maps, glossaries, and/or illustrations—contribute to the meaning of texts.		x	
ELA.2.R.2.2 - Identify the central idea and relevant details in a text.	x	x	
ELA.2.R.3.2 - Retell a text to enhance comprehension.	x	x	
ELA.2.V.1.3 - Identify and use context clues, word relationships, background knowledge, reference materials, and/or background knowledge to determine the meaning of unknown words.	x	x	
Florida Next Generation Sunshine State Science			
SC.2.N.1.6 - Explain how scientists alone or in groups are always investigating new ways to solve problems.	x		
SC.2.L.17.1 - Compare and contrast the basic needs that all living things, including humans, have for survival.	x		
Florida Next Generation Sunshine State Social Studies			
SS.2.E.1.1 - Recognize that people make choices because of limited resources.	x	x	
SS.2.C.2.4 - Identify ways citizens can make a positive contribution in their community.		x	
Florida B.E.S.T. Mathematics			
MA.2.NSO.2.3 - Add two whole numbers with sums up to 100 with procedural reliability. Subtract a whole number from a whole number, each no larger than 100, with procedural reliability.			x
MA.2.AR.1.1 - Solve one- and two-step addition and subtraction real-world problems.			x
MA.2.DP.1.2 - Interpret data represented with tally marks, tables, pictographs or bar graphs including solving addition and subtraction problems.			x

Florida Next Generation Sunshine State Health			
HE.2.C.1 - Comprehend concepts related to health promotion and disease prevention to enhance health.			X
HE.2.B.3 - Demonstrate the ability to access valid health information, products, and services to enhance health.			X
HE.2.B.4 - Demonstrate the ability to use interpersonal-communication skills to enhance health and avoid or reduce health risks.			X

Grade 3 Standards Alignment	Activity 1	Activity 2	Activity 3
Florida B.E.S.T. English Language Arts Standards			
ELA.3.R.2.1 - Explain how text features contribute to meaning and identify the text structures of chronology, comparison, and cause/effect in texts.		X	
ELA.3.R.2.2 - Identify the central idea and explain how relevant details support that idea in a text.	X	X	X
ELA.3.C.1.3 - Write opinions about a topic or text, include reasons supported by details from one or more sources, use transitions, and provide a conclusion.			X
ELA.3.C.2.1 - Present information orally, in a logical sequence, using nonverbal cues, appropriate volume, and clear pronunciation.		X	
ELA.3.V.1.1 - Recognize and appropriately use grade-level academic vocabulary in speaking and writing.	X	X	
Florida Next Generation Sunshine State Science Standards			
SC.3.P.9.1 - Describe the changes water undergoes when it changes state through heating and cooling by using familiar scientific terms such as melting, freezing, boiling, evaporation, and condensation.		X	
SC.3.N.3.2 - Recognize that scientists use models to help understand and explain how things work.	X	X	
Florida B.E.S.T. Mathematics Standards			
MA.3.NSO.2.1 - Add and subtract multi-digit whole numbers including using a standard algorithm with procedural fluency.			X
MA.3.AR.1.2 - Solve one- and two-step real-world problems involving any of four operations with whole numbers.			X
MA.3.DP.1.2 - Interpret data with whole-number values represented with tables, scaled pictographs, circle graphs, scaled bar graphs or line plots by solving one- and two-step problems.			X

Florida Next Generation Sunshine State Health Standards			
HE.3.C.1 - Comprehend concepts related to health promotion and disease prevention to enhance health.			X
HE.3.B.3 - Demonstrate the ability to access valid health information, products, and services to enhance health.			X
HE.3.B.4 - Demonstrate the ability to use interpersonal-communication skills to enhance health and avoid or reduce health risks.			X

Grade 4 Standards Alignment	Activity 1	Activity 2	Activity 3
Florida B.E.S.T. English Language Arts Standards			
ELA.4.R.2.1 - Explain how text features contribute to the meaning and identify the text structures of problem/solution, sequence, and description in texts.		X	
ELA.4.R.2.4 - Explain an author's claim and the reasons and evidence used to support the claim.			X
ELA.4.R.3.2 - Summarize a text to enhance comprehension	X	X	
ELA.4.C.1.3 - Write to make a claim supporting a perspective with logical reasons, using evidence from multiple sources, elaboration, and an organizational structure with transitions.			X
ELA.4.C.2.1: Present information orally, in a logical sequence, using nonverbal cues, appropriate volume, and clear pronunciation.		X	
ELA.4.V.1.1: Recognize and appropriately use grade-level academic vocabulary in speaking and writing.	X	X	
Florida Next Generation Sunshine State Science Standards			
SC.4.E.6.3 - Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable.	X		
SC.4.E.6.6 - Identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).	X	X	
SC.4.L.17.4 - Recognize ways plants and animals, including humans, can impact the environment.	X	X	
SC.4.N.3.1 - Explain that models can be three dimensional, two dimensional, an explanation in your mind, or a computer model.		X	
Florida Next Generation Sunshine State Social Studies Standards			
SS.4.A.4.1 - Explain the effects of technological advances on Florida.	X		
Florida Next Generation Sunshine State Health Standards			
HE.4.C.1 - Comprehend concepts related to health promotion and disease prevention to enhance health.			X

HE.4.B.3 - Demonstrate the ability to access valid health information, products, and services to enhance health.			X
HE.4.B.4 - Demonstrate the ability to use interpersonal-communication skills to enhance health and avoid or reduce health risks.			X

Grade 5 Standards Alignment	Activity 1	Activity 2	Activity 3
Florida B.E.S.T. English Language Arts Standards			
ELA.5.R.2.1 - Explain how text structures and/or features contribute to the overall meaning of texts.		X	
ELA.5.R.2.2 - Explain how relevant details support the central idea(s), implied or explicit.	X	X	
ELA.5.R.2.4 - Track the development of an argument, identifying the specific claim(s), evidence, and reasoning.			X
ELA.5.C.1.3 - Write to make a claim supporting a perspective with logical reasons, relevant evidence from sources, elaboration, and an organizational structure with varied transitions.			X
ELA.5.V.1.1 - Recognize and appropriately use grade-level academic vocabulary in speaking and writing.	X	X	
Florida Next Generation Sunshine State Science Standards			
SC.5.E.7.1 - Create a model to explain the parts of the water cycle. Water can be a gas, a liquid, or a solid and can go back and forth from one state to another.		X	
Florida Next Generation Sunshine State Social Studies Standards			
SS.5.C.2.5 - Identify ways good citizens go beyond basic civic and political responsibilities to improve government and society.		X	
Florida Next Generation Sunshine State Health Standards			
HE.5.C.1 - Comprehend concepts related to health promotion and disease prevention to enhance health.			X
HE.5.B.3 - Demonstrate the ability to access valid health information, products, and services to enhance health.			X
HE.5.B.4 - Demonstrate the ability to use interpersonal-communication skills to enhance health and avoid or reduce health risks.			X