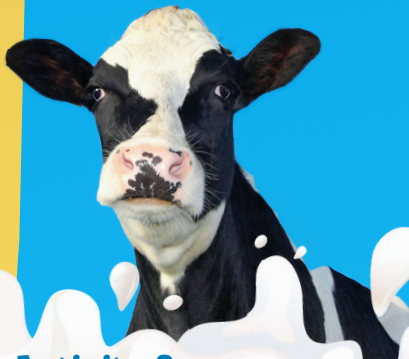
DairyTech



Dear Educator,

What do kids and cows have in common? They both use high-tech devices! The workings of a 21st-century American dairy farm can be a revelation for students who might not realize that the same types of technology that are part of their lives also play a big role in making dairy farming more productive for the farmer and beneficial for the cows.

This free educational program from United Dairy Industry of Michigan (UDIM), created in cooperation with the curriculum specialists at Young Minds Inspired (YMI), will teach students how modern farming methods that make use of the latest technology maintain the ongoing traditions of managing cow health and comfort while protecting natural resources through sustainable agricultural practices.

These standards-based activities support the Science and Health curriculum for students in grades 2-4, and introduce a variety of technologies used on the farm that make caring for cows and for the environment a more efficient and productive process.

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

MILK MEANS MORE

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 2-4 and their parents.

Program Objectives

- Help students learn about the science and technology behind modern dairy farming.
- Raise awareness of sustainable practices adopted by dairy farmers.
- Remind students how the nutrition in milk and other dairy products is part of a balanced diet every day.

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 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. Display the poster prominently and refer to it often, especially in helping students complete Activity 2. To review program standards alignment, visit ymiclassroom.com/milkmeansmore.

Activity 1
Sustainable Practices

Part A. Distribute the activity sheets. Read the directions and have students complete the farm sustainability sentences by unscrambling the words.

Answers:

1. the farm more energy efficient
2. exact areas of the field where it is needed
3. manure into energy to power the farm
4. habitat for wildlife that conserves soil and water
5. planting crops on the farm
6. cardboard and shredded paper
7. different kinds of programmable devices

M	V	I	D	E	O	S	Y	S	T	E	M	S	E	
Y	M	S	I	O	P	I	N	K	U	K	W	N	N	
Z	T	Y	M	A	C	Y	S	V	L	G	O	B	Y	
M	U	E	F	C	Y	C	Z	N	Z	H	J	L	Y	
R	S	V	Z	S	S	J	Z	B	P	P	D	N	A	
E	A	G	D	U	Q	I	V	T	V	F	R	F	Q	
T	O	O	Y	I	Y	M	R	U	E	U	O	I	C	
E	H	L	P	S	X	A	V	B	I	U	N	V	D	
M	X	S	I	U	M	M	O	G	V	B	E	Y	Y	
O	O	G	P	S	T	R	D	M	N	F	W	M	H	
D	G	R	V	E	Z	Q	H	I	E	S	B	G	T	
E	W	S	L	E	N	A	P	R	A	L	O	S	N	
P	A	B	Q	S	X	C	B	X	S	X	D	M	C	
A	A	V	D	H	Y	W	Y	G	R	V	Q	F	V	
T	W	X	K	X	G	G	M	Q	N	N	O	Y	A	

Part B. After students complete the word search, have them share their knowledge of and experience with any personal use of the devices listed. Help them compare personal or general knowledge of the way these devices work with how they are specifically used on the dairy farm as follows:

- **Drone** – helps monitor dairy herd in the pasture, observes soil health, makes crop measurements in the field.
- **GPS** (Global Positioning System) – aids in precision crop planting and fertilizer application.
- **Solar Panels** – help generate electricity and heat water for washing equipment on the farm.
- **Pedometer** – records cows' steps during the day to make sure they stay active and healthy. If a cow is not taking as many steps as she should, the dairy farmer knows she is not feeling well.
- **Smartphone** – apps allow better close monitoring of the herd, helps farmers with paperwork and general farm management.
- **Video Systems** – used in the barn and around the farm, help farmers maintain safety and better care of animals.
- **Tablet** – helps farmers access apps that provide them with instant information anytime, anywhere.

Activity 2
From Cow to Cup – Tech Style!

After students complete the activity, direct their attention to the program poster. Help students self-check their work by reading and discussing the description of each tech tool featured on the poster and correlating it to its description on the activity sheet. Then challenge students to name some examples of technology they or their families use that might serve the same type of function. Have students share their ideas in a class discussion.

Answers: A. 4, B. 3, C. 1, D. 5, E. 2, F. 6

Activity 3
Comfortable = Healthy

Distribute the activity sheets and review the directions with students, as well as the health benefits listed for the 9 essential nutrients found in milk. Encourage students to help their parents prepare the recipe at home.

V	D	O	S	B	V	I	U	S	T	C	A	L	Q	L	D	P	C	M	P	H	O	S	Z	T
I	T	A	E	H	J	T	A	F	Q	W	K	C	I	O	Z	R	B	L	L	T	Q	P	K	M
X	Y	M	L	S	G	H	M	I	N	D	O	R	U	M	T	O	T	E	I	N	W	H	B	C
A	A	I	H	J	R	L	K	A	O	B	P	N	N	S	B	J	L	O	O	W	U	O	E	V
Z	S	N	T	F	I	B	O	J	J	H	A	X	W	C	P	D	L	S	B	V	M	R	U	S
Q	F	B	O	X	H	N	F	L	A	C	N	T	A	O	S	A	X	U	D	I	T	Q	Z	B
B	E	1	H	U	K	Z	N	Q	V	U	T	O	T	H	E	N	I	C	A	X	A	M	Y	H
M	Q	2	M	H	F	K	C	L	I	J	H	N	I	L	V	H	V	R	C	R	4	I	W	L
Z	N	W	D	J	N	O	R	Z	N	O	M	B	A	C	I	N	C	J	I	P	T	N	T	L
A	C	E	G	I	K	M	O	Q	S	U	W	Y	B	D	F	H	J	L	D	P	R	A	V	X

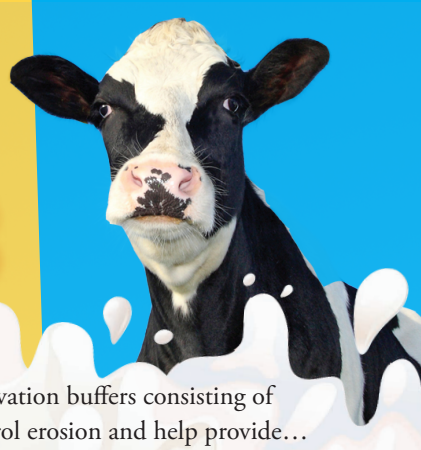
Resources

- ymiclassroom.com/milkmeansmore
- United Dairy Industry of Michigan: milkmeansmore.org
- Virtual Farm Tours to Michigan Dairy Farms: milkmeansmore.org/virtual-farm-tour/
- Innovation Center for U.S. Dairy: usdairy.com/about-us/innovation-center
- National Dairy Council: nationaldairycouncil.org
- USDA MyPlate: choosemyplate.gov

ACTIVITY 1

Reproducible Master

Sustainable Practices



Part A. Dairy farmers and their families live on the land they farm, so protecting the environment around them and their cows is important. The farming methods they use are *sustainable* — that means they help protect the environment. And farmers also get some help from technology!

Put the words below in the right order to complete sentences that will help you find out how technology helps farmers. Record the completed sentence on the blank lines.

1. Solar panels at Reid Dairy Farm in Michigan help make…

_____

_____.

more the efficient farm energy

2. Many dairy farmers feed their herds with crops grown on their farms to practice sustainability. Some use self-driving tractors equipped with GPS (Global Positioning Systems) to enable them to plant and fertilize in…

_____

_____.

exact the areas field of it where is needed

3. Methane digesters turn… _____

_____.

into manure the energy farm to power

4. Some dairy farmers create conservation buffers consisting of native trees and grasses that control erosion and help provide…

_____

_____.

soil wildlife for conserves and water that habitat

5. Automated scrapers clean barns of manure. They are the first step in processing the manure into fertilizer to improve the soil for…

_____

_____.

farm crops on planting the

6. Many dairy farmers provide comfortable bedding for their cows by using recycled…

_____

_____.

and paper shredded cardboard

7. Dairy farmers can efficiently manage barn conditions like lighting, cow soaker systems, and air filtration systems with…

_____

_____.

kinds of different devices programmable

Part B. Technology also helps dairy farmers pay bills and manage cow health and employee records. That gives farmers more time to keep their herds healthy in order to produce fresh, high-quality milk. Complete the word search at right to find other examples of 21st-century farm technology. Have you had any experience with using technology like this? How do you think it works on the farm?

Word Bank:

- Drone
- GPS
- Pedometer
- Smartphone
- Solar Panels
- Tablet
- Video Systems

M	V	I	D	E	O	S	Y	S	T	E	M	S	E
Y	M	S	I	O	P	I	N	K	U	K	W	N	N
Z	T	Y	M	A	C	Y	S	V	L	G	O	B	Y
M	U	E	F	C	Y	C	Z	N	Z	H	J	L	Y
R	S	V	Z	S	S	J	Z	B	P	P	D	N	A
E	A	G	D	U	Q	I	V	T	V	F	R	F	Q
T	O	O	Y	I	Y	M	R	U	E	U	O	I	C
E	H	L	P	S	X	A	V	B	I	U	N	V	D
M	X	S	I	U	M	M	O	G	V	B	E	Y	Y
O	O	G	P	S	T	R	D	M	N	F	W	M	H
D	G	R	V	E	Z	Q	H	I	E	S	B	G	T
E	W	S	L	E	N	A	P	R	A	L	O	S	N
P	A	B	Q	S	X	C	B	X	S	X	D	M	C
A	A	V	D	H	Y	W	Y	G	R	V	Q	F	V
T	W	X	K	X	G	G	M	Q	N	N	O	Y	A

The amount dairy farmers have reduced their carbon footprint in the past 60 years?

63%!

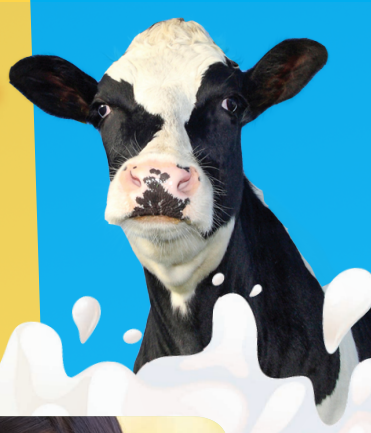
MILK MEANS MORE

Local milk is available 365 days a year.

ACTIVITY 2

Reproducible Master

From Cow to Cup—Tech Style!



Technology on our farm helps us moo-ve the milk from cow to cup! Here are some cool ways we use technology to keep our cows healthy, comfortable, and productive. Can you match the process to the name of the tech tool used? Check out the poster to learn more about these devices and the links next to the descriptions below to see some of them in action!

Tech Tools

1. Cow Manager System

2. Automatic Feed Pusher

3. Pedometer

4. Robotic Milker

5. Robotic Calf Feeding System

6. PocketDairy App

Process

___ **A.** This cool device lets the cow get milked when she wants to and only takes between two and five minutes. It also removes bacteria from her udder and keeps her very clean to produce pure, wholesome milk. See one in action at youtube.com/watch?v=4ahez-7cDdM.

___ **B.** Knowing how many steps a cow takes each day lets the farmer keep track of her activity level. If she doesn't take as many steps as she should, it could mean she's sick and may need a vet.

___ **C.** This tiny object fastened to the cow's ear measures her temperature and how much time she spends eating each day. It can even register whether or not she is ruminating, or digesting, her feed.

___ **D.** This machine provides warm milk to calves at regular intervals throughout the day. And boy, do they love that! See one in action at youtube.com/watch?v=OpSjfCBycNM.

___ **E.** Did you know cows are picky eaters? They like to find the best parts of their feed first! Trouble is, they push feed away in the process. This clever machine pushes the feed back so they clean their plates – uh, make that their troughs! See one in action at youtube.com/watch?v=4-PWgrXI2Ck.

___ **F.** Keeping up with every cow in the herd is a big job. Luckily, there's an app for that!

You and your family use technology for fun or to help with things around the house, too — devices that track your health or fitness performance, dishwashers and robotic vacuum cleaners to make cleaning tasks easier, vending and ice machines that dispense your favorite drink and the ice to cool it with and, of course, your smartphone or tablet loaded with a fun game app.

Study the farm technology on the poster and see if you can name something you or your family uses that performs a similar kind of function. For example, both cows and humans wear pedometers to track their steps! Share your ideas in a class discussion.

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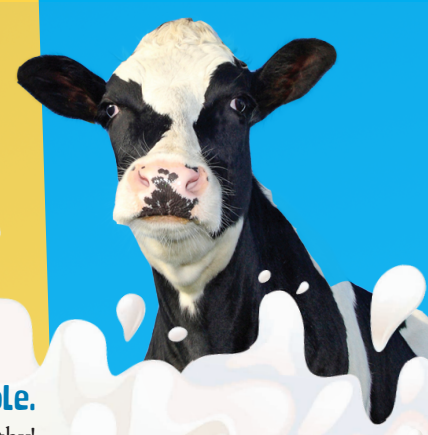
ACTIVITY 3
Reproducible Master

Comfortable = Healthy



Technology helps dairy farmers keep their cows healthier and more comfortable.

And comfortable, healthy cows produce wholesome and nutritious milk and milk products to keep *you* healthy!

There are 9 essential nutrients in every glass of milk that your body needs in order to grow strong and healthy. See if you can unravel this word snake puzzle to find these essential nutrients, which are listed below. Remember that the letters go in snake-like directions, rather than up, down, or vertically. Each word starts with one of the red letters. The first one is done to help you get started.

V	D	O	S	B	V	I	U	S	T	C	A	L	Q	L	D	P	C	M	P	H	O	S	Z	T
I	T	A	E	H	J	T	A	F	Q	W	K	C	I	O	Z	R	B	L	L	T	Q	P	K	M
X	Y	M	L	S	G	H	M	I	N	D	O	R	U	M	T	O	T	E	I	N	W	H	B	C
A	A	I	H	J	R	L	K	A	O	B	P	N	N	S	B	J	L	O	O	W	U	O	E	V
Z	S	N	T	F	I	B	O	J	J	H	A	X	W	C	P	D	L	S	B	V	M	R	U	S
Q	F	B	O	X	H	N	F	L	A	C	N	T	A	O	S	A	X	U	D	I	T	Q	Z	B
B	E	1	H	U	K	Z	N	Q	V	U	T	O	T	H	E	N	I	C	A	X	A	M	Y	H
M	Q	2	M	H	F	K	C	L	I	J	H	N	I	L	V	H	V	R	C	R	4	I	W	L
Z	N	W	D	J	N	O	R	Z	N	O	M	B	A	C	I	N	C	J	I	P	T	N	T	L
A	C	E	G	I	K	M	O	Q	S	U	W	Y	B	D	F	H	J	L	D	P	R	A	V	X

Essential Nutrients

- **Calcium** – builds and maintains strong bones and teeth, important for strong muscles
- **Niacin** – supports many body systems and helps the body process sugars and fatty acids
- **Phosphorus** – strengthens bones; needed for healthy body cells
- **Pantothenic Acid** – helps your body convert nutrients to fuel to produce energy
- **Protein** – builds and repairs muscle tissue
- **Riboflavin** – helps convert food to energy
- **Vitamin A** – maintains healthy vision, healthy skin; regulates cell growth
- **Vitamin B12** – builds red blood cells to carry oxygen throughout body
- **Vitamin D** – helps body absorb calcium; supports bone health

Farmer Tested, Farmer Approved

It's only natural that dairy farmers and their families enjoy many milk products as part of their balanced diet. Here's an easy, on-the-go meal from Kristi Keilen, Once Upon a Dairy of K&K Dairy Farms in Westphalia, Michigan!

Find more dairy farmer-tested and -approved recipes for meals and snacks at milkmeansmore.org/recipe/.

Crockpot Fajitas

by Kristi Keilen
Serves: 4
Prep time: 10 minutes
Cook time: 4-6 hours

Ingredients:

1 onion, cut into strips
1 red bell pepper, cut into strips
1 orange bell pepper, cut into strips
2 chicken breasts, cut into strips
1 packet fajita seasoning
Flour tortillas, for serving
Shredded cheese, for topping
Sour cream, for topping (optional)

Instructions:

1. Put the onion, peppers, and chicken breasts into the crock pot with the seasoning. Cook on high for 4 hours, or low for 6 hours.
2. After the chicken and vegetables are done cooking, put a good handful of cheese on a flour tortilla and spoon on the fajita mixture.
3. Roll up and tuck the ends in. If you're feeding tractor drivers or kids on the go, roll it in tin foil for easy eating.

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GRADES 2-4 ENGLISH LANGUAGE ARTS[1]	Activity 1	Activity 2	Activity 3
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.	X	X	X
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.	X	X	X
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.	X	X	X
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.	X	X	X
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.	X	X	X
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.	X	X	X
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.	X	X	X
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.	X	X	X
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.	X	X	X

Reading Informational Text: Craft and Structure 4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.	X	X	X
Reading Informational Text: Craft and Structure 5. Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	X	X	X
Reading Informational Text: Integration of Knowledge and Ideas 7. Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).	X	X	X
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 topics and texts, building on others' ideas and expressing their own clearly.	X	X	X
Reading Informational Text: Key Ideas and Details 1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	X	X	X
Reading Informational Text: Key Ideas and Details 3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.	X	X	X
Reading Informational Text: Craft and Structure 4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.	X	X	X
Reading Informational Text: Craft and Structure 5. Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.	X	X	X
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 interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.	X	X	X

GRADES 2-4 SCIENCE STANDARDS[2]	Activity 1	Activity 2	Activity 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 can be solved through the development of a new or improved object or tool.	X	X	
3-5-ETS1-1 Engineering Design Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	X	X	
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 of the problem.	X	X	

GRADES 2-4 NATIONAL HEALTH STANDARDS[3]	Activity 1	Activity 2	Activity 3
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. **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.			X
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. **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.			X
Standard 7 Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks. **Grade 2** • 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.			X

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 Science Standards, www.michigan.gov/documents/mde/K-12_Science_Performance_Expectations_v5_496901_7.pdf
3. 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 www.cdc.gov/healthyschools/sher/standards/index.htm