

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 the American Dairy Association North East, 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 use the enclosed reply card or comment online at ymiclassroom.com/feedback-adane-dairy-tech 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

Dr. Dominic Kinsley
Editor in Chief, Young Minds Inspired

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

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

- 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-dairy-tech.

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 alignment with Common Core and national standards, visit ymiclassroom.com/adane-dairy-tech.

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



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.

Resources

- ymiclassroom.com/adane-dairy-tech
- American Dairy Association North East: americandairy.com
- Innovation Center for U.S. Dairy: dairygood.org
- National Dairy Council: nationaldairycouncil.org
- USDA MyPlate: choosemyplate.gov



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 Fulper Family Farms in New Jersey 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%!



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](https://www.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](https://www.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](https://www.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.



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 a great snack choice for chilly fall nights from Diane Hoover of Lebanon, Pennsylvania!

Find more dairy Farmer-tested and -approved recipes for meals and snacks at www.americandairy.com/dairy-foods.

Easy Chili Dip Recipe

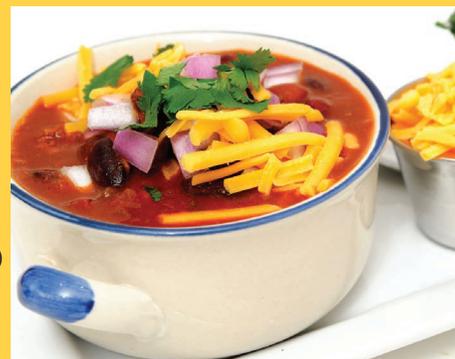
by Diane Hoover
Serves: 10
Prep time: 5 minutes
Cook time: 3 minutes

Ingredients:

- 1 (8-ounce) package of cream cheese, softened
- 1 (15-ounce) can of chili (with or without beans)
- 1 cup shredded cheddar cheese
- Tortilla chips

Preparation:

1. Spread cream cheese on bottom of microwave-safe 9-inch pie plate or dish.
 2. Pour can of chili on top and gently spread to cover cream cheese.
 3. Top with shredded cheese.
 4. Microwave, uncovered, for 3 minutes.
- Serve with tortilla chips and a glass of milk.



Dairy Tech

Check out these cool dairy farming tech tools. How is the tech that moo-ves milk from cow to cup similar to the tech tools you or your family might use at home and school?

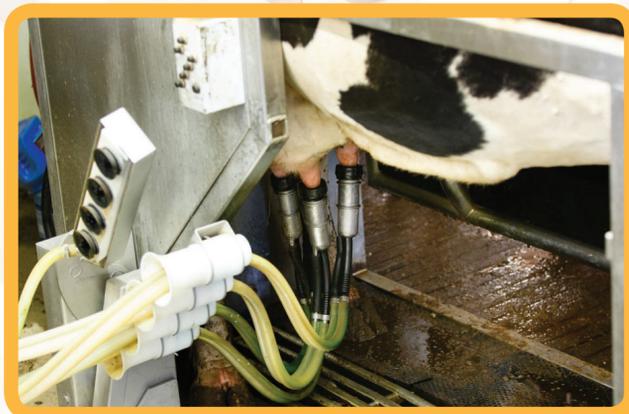


Furnace Hill Holsteins, Lebanon, PA

Cow Manager System

This cow's orange ear tag contains a computer microchip that monitors:

- cow activity
- eating time
- body temperature
- rumination (digestion)



Robotic Milker

- milks cows without human assistance
- cows enter milker when they want to be milked, triggering the robot to action
- laser detects position of cow's udder
- cleans udder and attaches suction cups with robotic arm
- opens parlor gate for cow to return to her bed, eat or drink water after milking



MapleLawn Farms, Lyon, NY

Automatic Feed Pusher

- automatically and quietly moves along the cow feeding trough
- pushes in feed
- charges at a docking station
- programmable to feed at specific times during the day



Dottener's Dairy, Mill Hall, PA (Candice White)

Pedometer

- contains computer chip that is read when cow enters milking parlor
- worn on cow's leg or on collar around their neck
- measures number of steps a cow takes each day
- transmits how much milk in pounds a cow gives during each milking



Ingimage

Smartphone/Tablet With PocketDairy App

- syncs wirelessly to provide farmers with information anytime, anywhere
- allows close monitoring of an entire herd
- helps farmers make decisions using diagnostic information



Crum Family Farm, Frederick, MD

Robotic Calf Feeding System

- provides warm milk to calves at regular intervals throughout the day
- dispenses milk in same portion and concentration as milk from mother
- dispenses either cow's milk or milk mixture like human baby formula



Tech tools help dairy farmers do what they do best – take care of their cows. Healthy, comfortable cows make fresh, delicious, nutrition-packed milk and, from that, other dairy products we all enjoy.



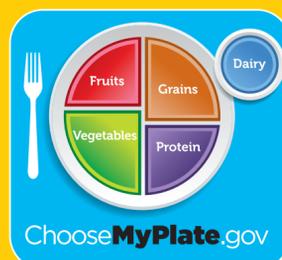
All milk, whether lowfat, whole, or flavored, contains three out of the four vitamins and minerals that children, teens, and adults are most likely to lack – potassium, calcium, and Vitamin D.



Local milk is available 365 days a year.



USDA MyPlate guidelines recommend these daily servings of milk and dairy products:



Ages 9 and up:
Three 8-ounce servings



Ages 4-8: 2.5 cups

