Dear Educator,

Recycling is an important sustainability practice that helps protect our environment. Your students most likely recycle at home, and dairy farmers recycle too — everything from the water they use to the food they feed their cows. In fact, even their cows are recyclers!

This free educational program from United Dairy Industry of Michigan (UDIM), created in cooperation with the curriculum specialists at Young Minds Inspired (YMI), highlights the role of recycling on dairy farms to help promote students' own sustainability practices. The program features standards-based activities that support Language Arts and Science standards for students in grades 2-4.

Please 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

DAIRY RECYCLERS

TARGET AUDIENCE
Elementary school students in grades 2-4 and their families

PROGRAM OBJECTIVES
- Create awareness of the role of dairy farmers in preserving and protecting the environment
- Encourage students to make recycling one of their sustainability goals
- Inspire students to examine sustainability practices they and their families can implement

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. Obtain milk cartons or yogurt containers, plates for catching excess water, soil, and lettuce or herb seeds of your choice for Activity 3. To review program alignment with language arts and science standards, visit ymiclassroom.com/milkmeansmore.

Activity 1
PLANET PROTECTORS: DYNAMIC DAIRY FARMERS!
Begin by holding up an empty milk or yogurt container and asking students if they recycle containers like these at home. Then guide them in a discussion about what it means to recycle (to convert waste into reusable material), and why it's important to recycle (to reduce waste and protect our environment). Show them the video at youtu.be/Z-874_l4tCA (4:25).

Explain that when we recycle, we are practicing sustainability, just like dairy farmers. In fact, dairy cows help farmers recycle. Distribute the activity sheet and have students read Part 1 before they answer the questions. ***Answers:*** 1. cooling mist in barns, drinking water, wash equipment; 2. newspaper, tires, sand, dried manure; 3. bedding, fertilizer, electricity.

Have students complete Part 2 by listing materials or products they recycle in school and at home. For example, water used to wash dishes (graywater) or saved in clean rinsed-out milk containers when running tap water to get it hot can also irrigate the garden. Answers will vary.

Activity 2
DAIRY COWS: NATURE'S MOO-VELOUS RECYCLERS!
Dairy cows are multi-taskers when it comes to recycling. Their ability to digest foods that cannot be eaten by humans means that they recycle all kinds of "leftovers" as part of their diet. And they turn that diet into milk and its dairy products.

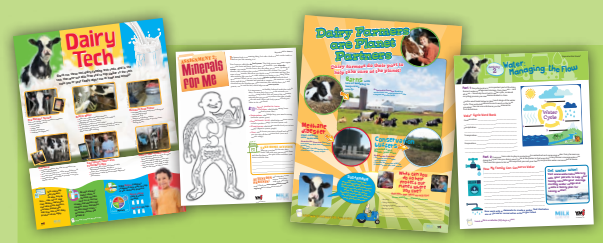
Pair students and give them about five minutes to discuss the foods they think cows might eat, then have them share their ideas with the class. Next tell them that cows eat "leftovers" (called by-products) from foods made for humans — things like peels, seeds, and pulp that could otherwise end as trash in landfills. These by-products are mixed with grain and give cows the nutrition they need, making them natural recyclers. Explain that dairy cows are also *upcyclers* because they turn this recycled food into something new — milk, which humans drink and use to make yogurt, cheese, and ice cream.

Distribute the activity sheet and review the instructions. ***Answers:*** Part 1 – (left circle) soybean meal, cottonseed, leftover vegetables, fruit pulp; (right circle) milk, yogurt, cheese, ice cream. Encourage students to use their imaginations to design cow recycling logos in Part 2.

Activity 3
SUPER STUDENT RECYCLERS!
Tell students they are going to practice recycling and farming by planting lettuce or herb seeds you give them in milk cartons or yogurt containers.

Create small drainage holes in the bottoms of the milk cartons or yogurt containers ahead of time with a nail or similar sharp object. Distribute the cartons, plates for catching excess water from the planters, soil, seeds, and activity sheets, and have students follow the directions in Part 1 to plant their seeds. Depending on your students, you might want to do this together, or let them work independently.

For Part 2, explain that another way of recycling to help plants grow is composting, which converts selected food scraps into fertilizer. Have students read the paragraphs and then work with a partner to answer the questions. If time permits, view this video on composting at youtu.be/kA3q07paNbE (2:52).



THERE'S A LOT MORE DAIRY LEARNING ONLINE!
Visit **ymiclassroom.com/milkmeansmore** to explore additional programs on a wide range of dairy farming topics:

Nutrition
- Mission Nutrition: Dairy Every Day
- Healthy Farming, Healthy You

Farming, Technology, and Sustainability
- Planet Partners
- Dairy Tech
- Water Wise

Virtual Dairy Farm Tour
Go to **milkmeansmore.org/virtual-farm-tour** to watch, learn about, and register for LIVE virtual farm tours.
- Grades PreK-2 Virtual Farm Tour of Walnutdale Farms in western Michigan: **https://youtu.be/EyA6R_tXTL8** with **Academic Standards**
- Grades 3-5 Virtual Farm Tour of Ritter Farms in Byron, Michigan: **https://youtu.be/7qls6Pf9H7M** with **Academic Standards**

Activity 1

PLANET PROTECTORS: DYNAMIC DAIRY FARMERS!

Reproducible Master

Dairy farmers like the Vanderploeg family of Ithaca, MI, take great care to ensure their cows are healthy and content.

Dairy cows on sand bedding at a Michigan dairy farm.

Part 1: Recycling helps protect the planet by reducing the amount of natural resources we use, such as water. Read the paragraph below. Then fill in the chart.

Did you know that dairy farmers are planet protectors? They care about the environment! They recycle and reuse all kinds of things on the farm. For example, the water they use to cool fresh milk is the same water their cows drink. (Cows like warm water.) Dairy farmers also reuse that same water in misters to cool off their cows in the summer. They even reuse the water to wash farm equipment. Dairy farmers use recycling to give their cows comfortable beds, too. Cows love to sleep on sand, which can be cleaned and reused repeatedly. They also like to sleep on shredded newspapers, shredded tires, and manure — dried cow waste that has been cleaned and crumbled to make a soft bedding. And manure can be recycled in other ways. Dairy farmers use it to make electricity and as a fertilizer to help their crops grow. That's a lot of recycling!

1. Name three ways dairy farmers recycle the water used to cool fresh milk.

1. _____
2. _____
3. _____

2. Name four things dairy farmers recycle to use as cow bedding.

1. _____
2. _____
3. _____
4. _____

3. Name three ways dairy farmers can recycle cow manure.

1. _____
2. _____
3. _____

Part 2: Are you a planet protector? Look at the chart at the right. On the left side, list ways you and your family recycle and reuse at home and at school. On the right side, list new ideas for recycling to protect our planet.

THINGS WE ALREADY RECYCLE OR REUSE	NEW WAYS WE CAN RECYCLE AND REUSE

Local milk is available 365 days a year.

MILK MEANS MORE

YMI YOUNG MINDS INSPIRED

Activity 2

DAIRY COWS: NATURE'S MOO-VELOUS RECYCLERS!

Reproducible Master

Fourth-generation dairy farm family, the Lamb Family, walking through their alfalfa field just five miles from Lake Huron. On Lamb Dairy Farm, they recycle water, fertilize their crops with the cows' manure, and have practices in place to minimize soil erosion.

Part 1: You've learned that dairy cows are *recyclers* because they can digest and use the nutrients from food by-products that people usually throw away. These foods become part of their balanced diet. And dairy cows are *upcyclers* because they turn those recycled food by-products into fresh, wholesome milk.

Now look at the two circles below. Unscramble the words in the left circle to identify food by-products that cows recycle. Unscramble the words in the right circle to identify new dairy foods that cows produce.

COWS ARE RECYCLERS.

NYBOSEA ALEM

_____

TONDEESCOT

_____

OVEREFTL TABLEEVEGS

_____

TRUIF LUPP

_____

COWS ARE UPCYCLERS.

LKIM

_____

GURTOY

_____

EEESHC

_____

CIE MREAC

_____

Did you know that nearly 80% of what a dairy cow eats cannot be digested by humans?

Part 2: Now, get creative. On the back of this sheet, design a recycling symbol that shows how dairy cows are recyclers and upcyclers. Look at this recycling symbol to help you think of an idea.

Local milk is available 365 days a year.

MILK MEANS MORE

Activity 3

SUPER STUDENT RECYCLERS!

Reproducible Master

Part 1: Practice recycling by reusing a milk-carton or yogurt-container "pot" and the materials your teacher gives you to grow your own lettuce or herbs, using these directions:

1. Fill your pot with soil, leaving about an inch of space at the top.
2. Press the seeds gently into the soil to the depth your teacher tells you.
3. Sprinkle the pot with water until the soil is evenly moist.
4. Place the pot on a plate that can catch draining water.
5. Now place the pot in a sunny location and watch your "crop" grow!

Tips!
Keep the soil moist. Be sure to empty the plate as water collects.

Track your crop's growth each week on the chart.

DATE	HEIGHT

Part 2: Now find out how you can keep recycling at home. Read the paragraph below, and work with a partner to answer the questions.

Composting is a way to make fertilizer to help plants grow. It's easy! You just put kitchen leftovers, like eggshells, fruit peels, and vegetable trimmings, into a container. Then you add a layer of dried leaves that you've collected in the fall. Sprinkle some soil over the dry leaves, then keep adding new layers of leftovers and dry leaves. The leftovers contain lots of nitrogen. The dry leaves contain lots of carbon. When they biodegrade after 6-12 months, the nitrogen mixes with the carbon to make fertilizer that you can use to grow vegetables and flowers!

1. Think about how dairy cows recycle leftovers. How is this similar to composting?

_____

_____

_____

_____

2. Think about what you eat at home and at school. What food items do you throw away or put in the garbage disposal that you could compost? List some below.

_____

_____

_____

_____

_____

3. In addition to home, where else could families keep a compost container — in a community or school garden? Check out the possibilities and share your ideas in a classroom discussion.

Local milk is available 365 days a year.

MILK MEANS MORE

YMI YOUNG MINDS INSPIRED

EDUCATIONAL STANDARDS

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: 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
Writing: Research to Build and Present Knowledge 8. Recall information from experiences or gather information from provided sources to answer a question.	X	X	X
Reading Foundational Skills: Phonics and Word Recognition 3. Know and apply grade-level phonics and word analysis skills in decoding words.	X	X	X
Reading Foundational Skills: Fluency 4. Read with sufficient accuracy and fluency to support comprehension.	X	X	X
Language: Conventions of Standard English 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	X	X	X
Language: Knowledge of Language 2. Use knowledge of language and its conventions when writing, speaking, reading, or listening.	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: 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
Writing: Text Types and Purposes 2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.	X	X	X
Writing: Research to Build and Present Knowledge 8. Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.	X	X	X
Language: Conventions of Standard English 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	X	X	X
Language: Conventions of Standard English 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	X	X	X
Language: Knowledge of Language 3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.	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: 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
Writing: Text Types and Purposes 2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.	X	X	X
Writing: Research to Build and Present Knowledge 8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.	X	X	X
Language: Conventions of Standard English 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	X	X	X
Language: Conventions of Standard English 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	X	X	X
Language: Knowledge of Language 3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.	X	X	X

GRADES 2-4 SCIENCE STANDARDS[2]	Activity 1	Activity 2	Activity 3
K-ESS3-3 Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.	X	X	X
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-ETS1-2 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

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