

— FARM *to* YOU —



— Dairy —



Agriculture surrounds us in California, and it all starts with the sun, water, and energy. A sustainable food system preserves our environment, supports communities, and ensures a healthy future by producing nutritious food for people. California dairy farms lead the world in climate-smart farming. They find innovative ways to use and reuse water, upcycle agricultural byproducts, turn cow manure

into natural gas, and power the farm with solar energy. Cows have a complex digestive system that allows them to eat food humans can't, turning it into nutritious milk! Sustainability plays a big role on the journey from **Farm to You!**



From Farm to You: DAIRY

FARM: Milk comes from dairy farms where farmers take care of their cows. Many farms have open-sided barns where cows can eat, rest, and sleep comfortably. A cow starts to make milk in her udder after she gives birth to a baby cow, called a calf.

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MILKING: Cows enter a milking parlor two or three times each day for milking. Inside the parlor, the cow's udder is cleaned, and the milking machine is attached. This machine can milk a cow in five to seven minutes, a process that is quick and comfortable for the cow.

STORAGE: The milk flows through tubes into a refrigerated storage tank to keep it cold. It is tested for quality and safety. Afterward, the milk is transported in refrigerated trucks to a processing plant.

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PROCESSING: At the plant, the milk is pasteurized—heated to a high temperature and quickly cooled to kill harmful bacteria. Next, milk is homogenized, or mixed up, to make the texture smooth and creamy.

PACKAGING: Milk is put into cartons or made into other dairy foods such as cheese and yogurt. There are many different types of milk—whole milk, low fat, reduced fat, non-fat (skim) and with added flavors like chocolate. Milk is also used to make ice cream, butter, sour cream, kefir, and many different dairy foods.

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FOOD SERVICE & RETAIL: A refrigerated truck delivers these products to grocery stores, schools, hospitals, and restaurants. Within two days of leaving the farm, fresh milk is available for consumers to enjoy!

YOU: Consumers can enjoy safe and nutritious milk and dairy products year-round. Milk provides your body with 13 essential nutrients that support learning, playing, and growing. These nutrients are vital for healthy growth and development and taste good too!

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Lesson Plan: Cow-culating Waste Reduction

Introduction: The dairy industry plays a crucial role in reducing waste by upcycling agricultural byproducts—such as almond hulls, citrus pulp, and brewer's grains—into nutritious feed for cows. Instead of being discarded in landfills, these byproducts help produce milk and other dairy products.

Objective: Students will quantify the benefits of using agricultural byproducts as feed for dairy cattle.

California Standards: CC Math: 5.NBT.B.5, 7.NS.A.2

Materials: Books of various sizes, two scales (digital kitchen or digital body)

Preparation: Create six stacks of books, each representing the weight of a specific byproduct consumed by dairy cows. Label each stack accordingly: almond hulls (7 lbs.), cottonseed meal (3 lbs.), distiller's grains (6 lbs.), beet pulp (4 lbs.), canola meal (7 lbs.), citrus pulp (8 lbs.).

Procedure:

- 1 Explain that when food products are made, some parts are left over and are known as byproducts. Instead of being wasted, many of these byproducts can be repurposed as animal feed. For example, when oranges are juiced, the leftover peel and pulp still contain nutrients. Dairy cattle can eat dried citrus pulp and other byproducts, reducing waste while gaining valuable nutrition.
- 2 Show students the stacks of books, each representing the weight of a byproduct consumed by one cow in a day. Have students weigh each stack and record the weight, reminding them that these are estimations. In real life, dairy cows follow a unique diet formulated by an animal nutritionist.
- 3 Challenge students to calculate the total pounds of each byproduct consumed by a small herd (800 cows), a large herd (2,500 cows), and all dairy cows in California (1.7 million).
- 4 Lead a discussion on the dairy industry's role in reducing food waste. Ask students: What problem do cows help solve? How do they contribute to sustainability? Guide them to explore how dairy cattle recycle food byproducts into nutritious milk.

Activity: Dairy Nutrient Web

Introduction: Milk is California's largest agricultural commodity, offering a rich source of essential nutrients that play a vital role in supporting the human body's growth and development.

Objective: Students will identify key nutrients found in dairy products, understand their roles in human health, and recognize the quantities present in various dairy items.

California Standards:

Health Education: Grade 4: 1.1.N, Grade 7/8: 1.2.N, CTE Animal Science: D12.2

Materials: String, tape, poster paper, markers

Preparation: Write each nutrient and its definition on separate posters and place them on opposite sides of the room. Attach a long string to each nutrient poster, long enough to extend to its definition.

Directions:

- 1 Divide the students into two groups, and position them on opposite sides of the room. A line in the middle of the room marks a boundary that neither group may cross.
- 2 Students must collaborate across the room to match each nutrient with its correct definition. Once they agree on a match, the student holding the string will pass it to the other group, who will then tape it to the matching definition.
- 3 As the activity continues, the classroom will fill with a web of connections, showing how milk's nutrients work together to support growth and health—reminding students that one glass of milk contains numerous essential nutrients.
- 4 After the students have completed the activity, review the answers with the students. Provide more detail to the students about the nutritional benefits associated with consuming dairy products.



Scan the QR code to explore the essential nutrients in milk and how they support your health.

For more information about dairy, visit: LearnAboutAg.org