## Dairy Food Production

# Farm to Family

## *Life Science and Plant Science*

**Grade Level:** 3rd-5th grade
**Time:** 40 minutes

**Standards:**

Social Studies

Grade 4: Economics; Explain production, distribution and consumption of a product

Science

PS3.D: Energy in Chemical Processes and Everyday Life
LS1.C: Organization for Matter and Energy Flow in Organisms
LS2.A: Interdependent relationships in ecosystems

National Ag Literacy Outcomes

Plants and Animals for Food, Fiber and Energy Outcomes

Science

- Understand the concept of stewardship and identify ways farmers/ranchers care for soil, water, plants, and animals
- Describe the necessary food components of a healthy diet using the current dietary guidelines

Social Studies

- Diagram the path of production for a processed product, from farm to table

*For Kansas standards, visit www.ksde.org*

**Objectives**

1. Students will match word definitions to matchwords to definitions that explain the process of milk handling.

2. Students will understand the sequencing of milk production.

3. Students will understand that energy flows from the sun to plants to animals in a process known as photosynthesis to provide human food for energy.

4. Students will learn to flow of energy in a process called photosynthesis.

# Farm to Family

**Background Information**

Each dairy farm must meet a set of regulations before their products can be sold to consumers. Almost all of the milk produced in the United States is required to be pasteurized to make it safe to consume. After the cow is milked, the milk is cooled to 45 degrees fahrenheit and then picked up by the milk truck. The milk is tested before it is loaded on the truck it is tested for bacteria and quality and then tested again after being unloaded at the processing plant.

**Kansas Production**

In Kansas there are approximately 310 dairy herds and 5 plants that process dairy products. There are about 137,000 milk cows in Kansas located on a mixture of 300 large and small dairy farms. Dairies in Kansas produce nearly 2.9 billion pounds of milk annually and they rank 16th in U.S. milk production. In recent years, the value of milk that Kansas produced reached nearly $592 million and added approximately $131 million and 482 jobs to the economy in Kansas.

**Vocabulary**

- Trucking: Milk is collected from the farm in a cooled tank truck and brought to the plant to be processed.
- Testing: performing checks to ensure healthy and safe food.
- Homogenization: Fat is broken by machine into small pieces and distributed evenly through out the milk. This prevents cream from forming in each pack age.
- Pasteurization: Milk is heated to 160 degrees Fahrenheit and then cooled quickly. This makes milk safe to drink and helps it to stay fresh longer. It was named for Louis Pasteur who discovered that high temperatures kill bacteria
- Packaging: Milk is placed into cartons and jugs with labels indicating nutritional information.
- Delivering: Refrigerated trucks bring milk to schools and supermarkets for you to enjoy.

**Procedures**

1. Watch the following videos as a class:

   - http://www.midwestdairy.com/0p17i307/from-farm-to-store-video/

   America's Heartland Dairy Videos:
   - https://www.youtube.com/watch?v=LEXBIfzn--g

   - https://www.youtube.com/watch?v=dX2ypLI84nM&spfreload=10

   McCarty Dairy Farms:

   - https://www.youtube.com/watch?v=lrUhc7LtpGM

   - https://www.youtube.com/watch?v=-KaQseyBYF4

2. Have the students share thoughts of the videos with a partner.
3. Have the students share main ideas to the class.
4. Complete sequencing activity.

# Dairy Processing Steps

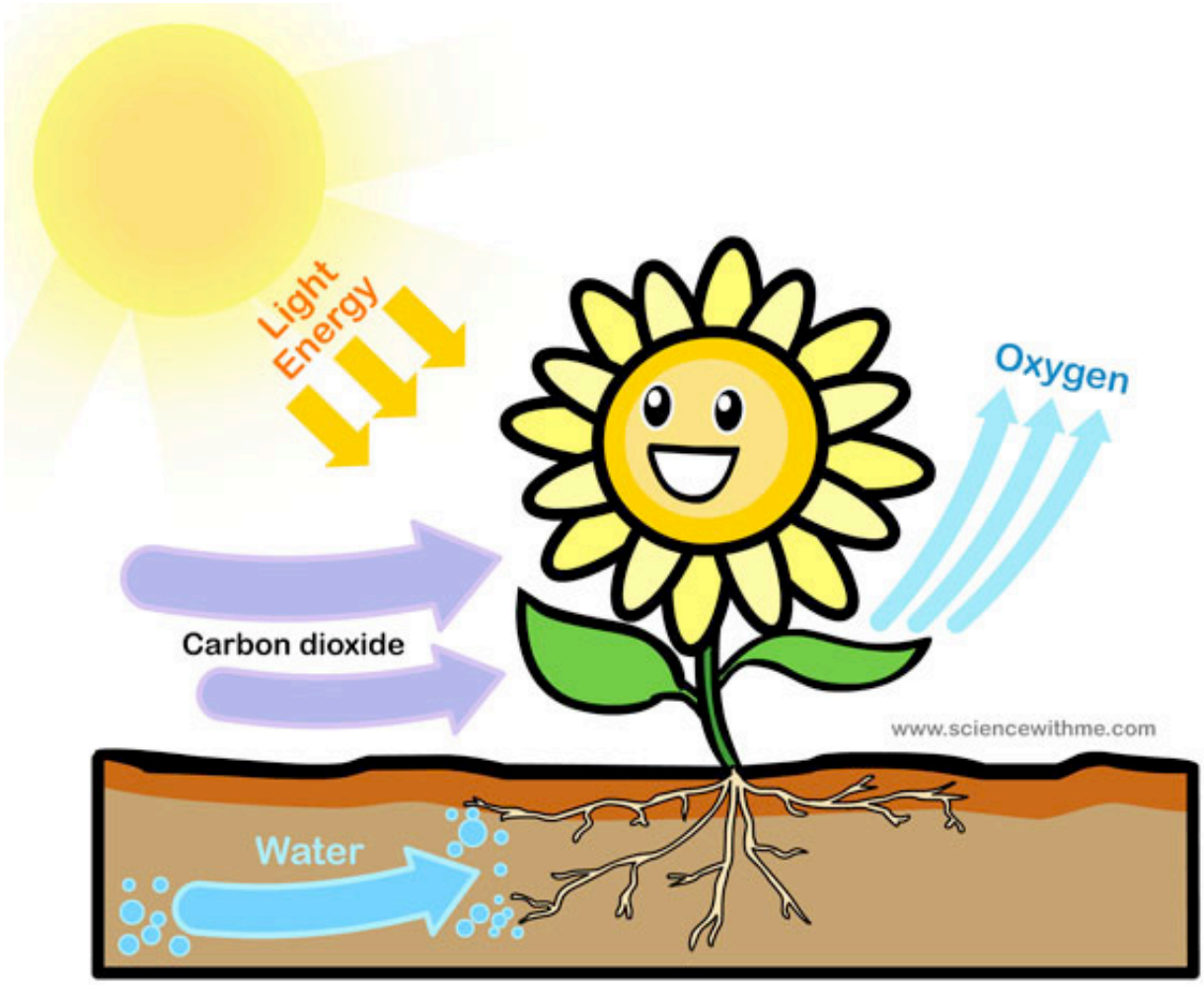
Copy and cut apart to distribute to groups of students. Match one bold step in the process to the italic definition of that step.

| | |
|---|---|
| **The farmer feeds the cow a balanced diet so she may produce milk.** | The cow needs to be healthy to produce milk naturally. |
| **The dairy farmer cleans the cow's udder.** | To make sure the cow stays healthy and the milk is as clean as possible. |
| **The cow is milked.** | Through the use of specialized machines that are designed to be comfortable to the cow. |
| **The milk goes into the bulk tank at the farm where it is kept cold.** | Maintained at a healthy temperature keeps it safe to drink |
| **The milk is tested at the farm and then taken to the processing plant.** | Testing ensures that the milk is safe before it is mixed in the truck with milk from other farms. |
| **The milk is tested at the processing plant.** | To make sure that the milk is safe, it is tested again before being processed. |
| **The milk is pasteurized and homogenized.** | Pasteurized milk is heated to at least 160 degrees Fahrenheit for 15 seconds to destroy bacteria. Homogenization disperses fat particles and ensures that the milk has consistent flavor. |
| **The products are packaged and delivered to stores, restaurants and schools.** | To ensure that you have delicious dairy products available to you wherever you eat. |
| **You drink milk, eat cheese, and have ice cream for dessert.** | Because 3-4 glasses of milk each day provide calcium and other nutrients to keep you healthy. |

# Dairy Processing Steps-Answers

| | |
|---|---|
| **Step One:**<br>**The farmer feeds the cow a balanced diet so she may produce milk.** | The cow needs to be healthy to produce milk naturally. |
| **Step Two:**<br>**The dairy farmer cleans the cow's udder.** | To make sure the cow stays healthy and the milk is as clean as possible. |
| **Step Three:**<br>**The cow is milked.** | Through the use of specialized machines that are designed to be comfortable to the cow. |
| **Step Four:**<br>**The milk goes into the bulk tank at the farm where it is kept cold.** | Maintained at a healthy temperature keeps it safe to drink |
| **Step Five:**<br>**The milk is tested at the farm and then taken to the processing plant.** | Testing ensures that the milk is safe before it is mixed in the truck with milk from other farms. |
| **Step Six:**<br>**The milk is tested at the processing plant.** | To make sure that the milk is safe, it is tested again before being processed. |
| **Step Seven:**<br>**The milk is pasteurized and homogenized.** | Pasteurized milk is heated to at least 160 degrees Fahrenheit for 15 seconds to destroy bacteria. Homogenization disperses fat particles and ensures that the milk has consistent flavor. |
| **Step Eight:**<br>**The products are packaged and delivered to stores, restaurants and schools.** | To ensure that you have delicious dairy products available to you wherever you eat. |
| **Step Nine:**<br>**You drink milk, eat cheese, and have ice cream for dessert.** | Because 3-4 glasses of milk each day provide calcium and other nutrients to keep you healthy. |

# Photosynthesis




Plants make their own food through a process called photosynthesis, which uses energy from the sun. Plants provide energy to animals like dairy cows in the form of carbohydrates. Grains from plants provide carbohydrate energy from the starch in the seeds. Forages such as alfalfa hay, are digested in the animal's four stomach compartments to provide energy and nutrients to the dairy cow. This unique ruminant digestive system allows cows to use forage sources for energy that monogastrics, like humans cannot. The dairy cow then takes nutrients from feed and water to make food in the form of milk. Check out the food label to see how much energy comes from the milk fat.

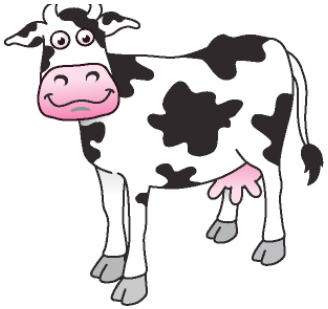
The dairy animal completes the energy cycle by passing unused plant matter in the form of manure. This can be used in methane digesters to produce energy. Manure can be distributed onto fields or pasture to provide fertilizer or nutrients to plants growing there, thus completing the energy cycle.

# Energy Cycle

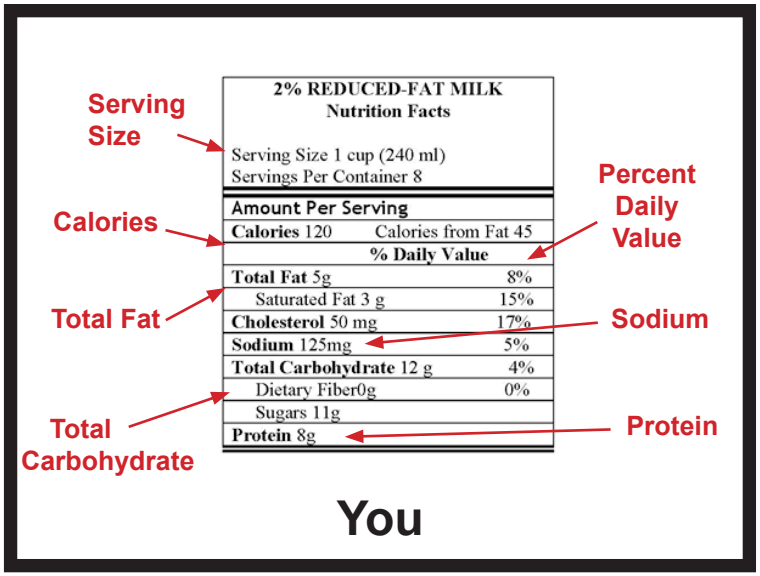
## Photosynthesis

Sunlight

Plants



Cow


You

# The Story of Milk

**Use these words to fill in the blanks**

trucks grocery store

cow processing plant parlor

A _____eats up to 8 times a day and likes cereal grains, forage, hay and cottonseed!

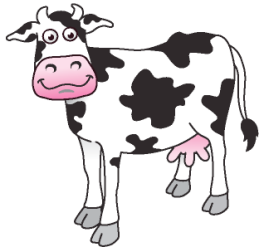
A _____ is where the cows are milked. The cow's udder holds the milk.

Special _____ keep the raw milk cold.

The _____ pasteurizes the milk so we can drink it.

The milk is ready for us to drink. We buy it at the _____.

**Use numbers 1-5 to put the pictures in the correct order**





_____ _____ _____ _____ _____

# The Story of Milk-Answers

**Use these words to fill in the blanks**

trucks grocery store

cow processing plant parlor

A cow eats up to 8 times a day and likes cereal grains, forage, hay and cottonseed!

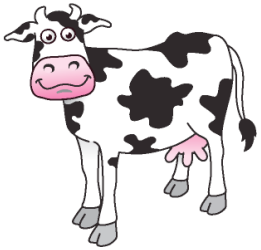
A parlor is where the cows are milked. The cow's udder holds the milk.

Special trucks keep the raw milk cold.

The processing plant pasteurizes the milk so we can drink it.

The milk is ready for us to drink. We buy it at the grocery store.

**Use numbers 1-5 to put the pictures in the correct order**



1

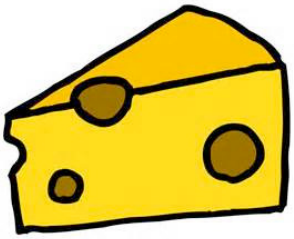
5

3

2

4

# What Dairy Foods Did I Eat Yesterday?



Cheese

Pudding or Custard

Yogurt

Ice Cream

Milk

**Want More? Extensions**

- Do a role play of the sequence of the diary production process.
- Interview a local dairy farmer.
- Watch a video about dairy production.
- Visit the link to Midwest Dairy's educational information and activities:

  http://www.midwestdairy.com/0t324p376/educator-resources-on-dairy-and-farming/