

Milk Math

Grade Level: 4-8

Lesson Overview

Most of us understand milk quantity by volume. A school lunch milk carton contains 8 ounces, 1 cup or $\frac{1}{2}$ pint. Jugs of milk at the grocery store usually contain 1 gallon. But dairy farmers measure the milk production of their cows by weight, not volume, and they are paid by the hundredweight, or 100 pounds of milk. Challenge students to convert milk measurements from volume to weight and back again as they explore the steps from udder to glass.

Student Objectives

1. Perform math calculations used in the dairy industry.
2. Perform simple conversions of U.S. measurements.
3. Create a flow chart detailing the steps of processing milk from farm to consumer.

Materials

- ✓ Milk Math worksheet
- ✓ Milk from Cow to You illustration

Vocabulary

- **hundredweight (cwt)** - a unit of weight in the U.S. Customary System equal to 100 pounds.

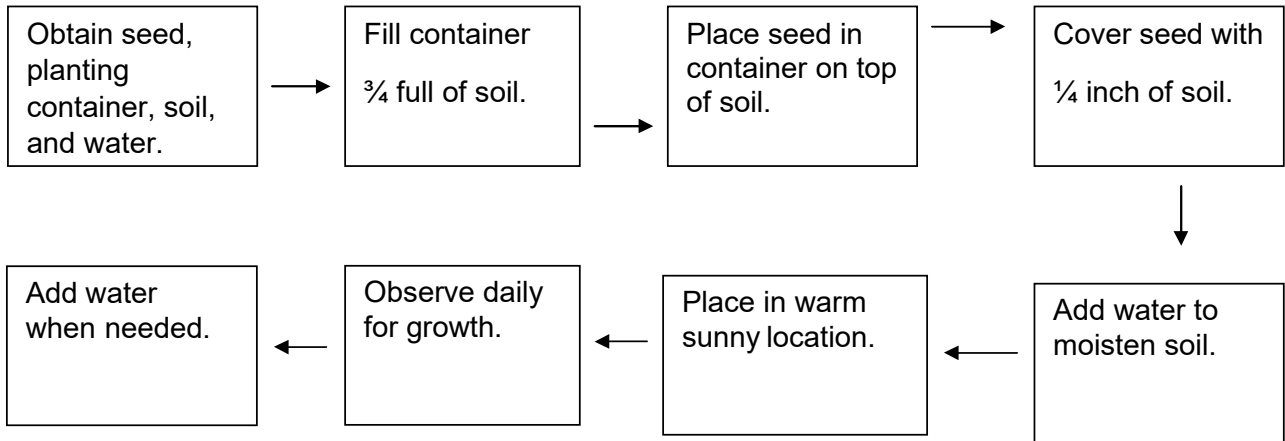
Procedure

1. Have the students complete the Milk Math worksheet to perform calculations used in the dairy industry.
2. Instruct the students on how to perform simple conversions of US measurement.

Liquid measure conversions:

- a. 2 cups = 1 pint
 - b. 2 pints = 1 quart
 - c. 4 quarts = 1 gallon
3. Describe the process of creating a flow chart to students. Outline the steps of processing milk with the students. Use the Milk From Cow to You illustration. Begin with the dairy cow on a dairy farm and end with the consumer enjoying milk at the dinner table.

- Next describe the process of creating a flow chart to students. The teacher may want to use a flow chart example, such as the one below, explaining the process of planting a seed to facilitate student understanding of creating flow charts.



Have students create their own flow chart detailing the steps of processing milk. Be sure students include the farmer, truck drivers, factory workers, and grocery store personnel.

Extension Activities

- The Tassel to Table lesson correlates well to this lesson's concepts of flow charts and following the path from farm to table.

Standard

Illinois Mathematics Standard

CC.6.RP.3d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

The **M**ultidisciplinary **A**gricultural **I**ntegrated **C**urriculum (mAGic) was created in 2004 under the leadership of the Illinois State Board of Education (ISBE) and the Facilitating Coordination in Agricultural Education Project (FCAE). Funding was made available through the FCAE grant budget from the agricultural education line item of the ISBE budget. This revision, as printed, was developed in September 2021.



These mAGic lessons are designed to bring agriculture to life in your classroom. They address the Illinois Learning Standards in math, science, English language arts and social studies.

Dairy mAGic project update writers/reviewers: Rhodora Collins – Dekalb County; Suzi Myers – Kane County; Connie Niemann – Montgomery County; Debbie Ruff – Livingston County; Jennifer Waters – Sangamon County; and Dawn Weinberg – Hancock County.

MILK FROM COW TO YOU



Name _____

Milk Math Worksheet

Mr. Smith has a dairy farm. When the milk truck comes to pick up the milk from his farm, it is weighed after the milk has been loaded on the truck. Mr. Smith is paid by the hundredweight of milk picked up from his farm. Weight is used because it is easier to measure the weight of the milk on the truck than to measure it by volume.

Consumers buy milk by volume measures, including pints, quarts and gallons. See how well you do with the conversions below, using the fact that there are 8.6 pounds in a gallon of milk. Show your work.

1. How many gallons are in a hundredweight (100-pounds) of milk?
2. How many quarts are in a hundredweight of milk?
3. How many pints are in a hundredweight?
4. How many cups are in a hundredweight?
5. If there are 1000 pounds of milk on the truck, how many gallons would that be?
6. If you count 80 gallons of milk for sale at the grocery store, how many hundred weights would that be?
7. If the farmer got \$17.62 per hundredweight for his/her milk, how much would he be paid per gallon of milk?
8. Create a flow chart showing all the steps involved in getting milk from the farm to your dinner table.

Milk Math ANSWER KEY

Mr. Smith has a dairy farm. When the milk truck comes to pick up the milk from his farm, it is weighed after the milk has been loaded on the truck. Mr. Smith is paid by the hundredweight of milk picked up from his farm. Weight is used because it is easier to measure the weight of the milk on the truck than to measure it by volume.

Consumers buy milk by volume measures, including pints, quarts and gallons. See how well you do with the conversions below, using the fact that there are 8.6 pounds in a gallon of milk. Show your work.

1. How many gallons are in a hundredweight of milk?
 $100 \text{ lbs of milk} / 8.6 \text{ lbs in a gallon of milk} = 11.6 \text{ gallons/hundredweight}$
2. How many quarts are in a hundredweight of milk?
 $11.6 \text{ gallons/hundredweight} \times 4 \text{ quarts per gallon} = 46.4 \text{ quarts/hundredweight}$
3. How many pints are in a hundredweight?
 $46.4 \text{ gallons} \times 2 \text{ pints per quart} = 92.8 \text{ pints/hundredweight}$
4. How many cups are in a hundredweight?
 $92.8 \text{ pints/hundredweight} \times 2 \text{ cups per pint} = 185.6 \text{ cups/hundredweight}$
5. If there are 1000 pounds of milk on the truck, how many gallons would that be?
 **$11.6 \text{ gallons/hundredweight} \times 10 \text{ lbs} = 116 \text{ gallons}$
 $(1000 \text{ lbs/hundred weight} = 10 \text{ lbs})$**
6. If you count 80 gallons of milk for sale at the grocery store, about how many hundredweights would that be?
 $80 \text{ gallons} / 11.6 \text{ gallons per hundredweight} = 6.8 / \text{hundredweight}$
7. If the farmer got \$17.62 per hundredweight of milk, how much would he be paid for a gallon of milk?
 $\$ 17.62 \text{ per hundredweight} / 11.6 \text{ gallons per hundredweight} = \$1.52/\text{gallon}$
8. Create a flow chart showing all the steps involved in getting milk from the farm to your dinner table.