

UNIVERSITY OF MINNESOTA

K-12 Education

Mammals, Milk and Math

Adapted by

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Objective: To determine the number of half-pints of milk a cow produces in a day and in a year using a real life math problem to work on math skills.

Introduction: Did you know that milk comes from cows? At milk break and in the lunchroom, you probably have some milk everyday. Why is it good to have milk everyday? According to the Food Guide Pyramid, how many servings of milk should we have a day? What size containers are used for the milk in the lunchroom? They are called half-pints. What we are going to work on in math today is finding the solution to this problem; “About how many half-pints of milk does an average cow produce in one day, and in one year?” (*Have an overhead of this question so that we can look at unknown vocabulary*). Are there any words here that we need to discuss before we can begin to work on this assignment? When the question starts with about, what does that mean? We know what half-pints are, we see them everyday, but do we know some of the equivalencies in cups, and quarts, and gallons that we might need to solve this problem? What does average mean, and how would that be calculated for the amount of milk given by a cow? Through our work we are also going to fill in two missing pieces of data from the commodity card that you will be provided.

Input and Activities: Divide the students into groups. The groups should consist of about four students. Have the students discuss in their groups, what information they would need to solve this problem. Choose someone from each group to record that information. After about five minutes have the groups take turns sharing what information they might need in order to successfully solve this problem. (*You will need a blank overhead in order to record their responses.*) Read through the modified commodity card and say that when we are all done with this activity we will be able to fill in the missing data from this card, and we will know how many half-pints of milk a cow can produce in a day, and in a year. (*To modify the card remove the number of gallons given in a day, and in a year. New cards are published each year so be sure to get the new card from MN Ag in the Classroom*). Show the various containers including gallons, half-gallons, quarts, pints, and half-pints. Give each group a set of containers so that they can be used to assist with solving the problem. (*At this point if the students were at the appropriate age or if available, balance scales would be used to measure mass as they convert pounds to cups or gallons.*) If balance scales are not used, provide the students with the following information: 1 gallon of milk weighs 8.6 pounds. (*That fact is included on the overhead provided with the lesson*). Explain to the students that there is no one right way to solve this problem, but at the end of the period they will be asked to share the process they used and what the approximate answers are for the missing pieces of data from the commodity card.

Closure: Have a follow-up discussion of the process they just went through. What made this problem difficult to solve? What made this problem easy to solve? What were some interesting

things that happened in their group as they worked to solve this problem? What were some difficulties they had in their group as they worked through this problem? Through this process, did they learn some interesting new facts about dairy cows? Review how many children can have a carton of milk at lunch thanks to one cow. Discuss some extension activities that could be calculated with the information we now have, such as how many cows would it take to provide milk at lunch for our whole school. Using the dairy commodity card, or any other commodity card, can their group come up with a problem for the class to solve? That may be where the next class period begins.

Materials Needed:

Handouts	Liquid measuring cups
Half-pint cartons	Pint, quart, half-gallon, & gallon containers
Commodity cards from MN Ag in the Classroom	Water
Scale/balance	Basin
	Paper towels

Extension Activities:

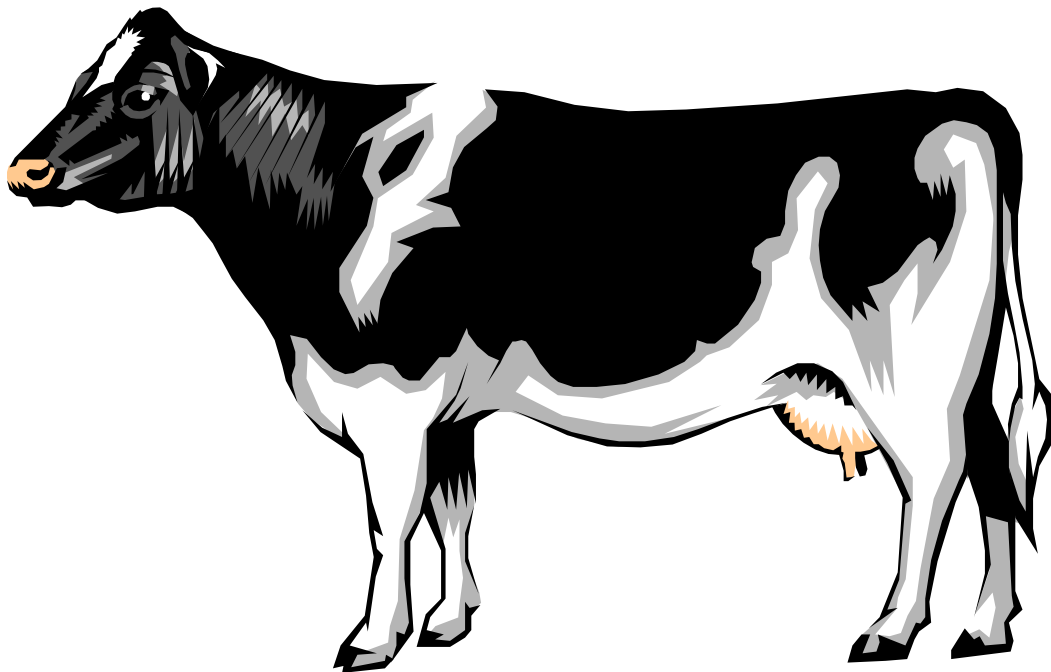
- Check with the school lunch program at your school. How many cartons of milk does your school use in a day and in a year? Have students calculate the number of cows needed to supply milk for various groups at your school such as the whole lunch program, milk breaks, different grade levels, high school, middle school, elementary school and so on.
- It is possible to access information about the amount of milk used in the whole state of Minnesota for school lunch programs. Check in your district office as to how that information can be obtained. Using that information, students can calculate the number of cows necessary to support the school lunch program in Minnesota.
- Using some of the other information presented on the commodity card create other problems to be solved by the students such as the amount of water and feed that would be necessary to support the number of cows for their school.
- Visit a dairy farm, or have a dairy farmer in to visit the classroom. Have her/him share with the class other math problems that he must solve in his business operation. Perhaps the students could work through some of those calculations, or create their own math problems.

Partnering:

University of Minnesota
College of Agricultural, Food and Environmental Sciences
Research and Outreach Centers*
Minnesota Ag Education Leadership Council
Extension Service
Minnesota Ag in the Classroom
Minnesota Pork Board
Minnesota Soybean Research and Promotion Council
Midwest Dairy Association
Martin County Corn and Soybean Growers
Redwood Area Schools

*Centered at Southwest Research and Outreach Center

“About how many half-pints of milk does an average cow produce in one day and in one year?”



One gallon of water weighs 8 pounds

One gallon of milk weighs 8.6 pounds.