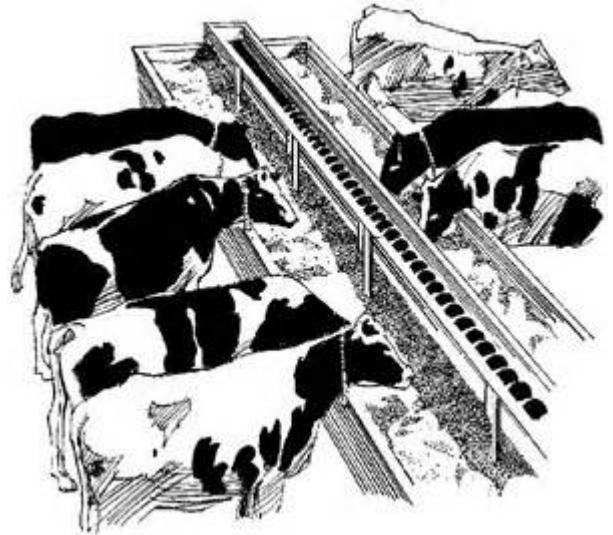




DAIRY ECONOMICS

There is more to the price of milk than most people realize. Not only do the dairy farmers not control the price of milk at the supermarket, but they receive only a portion of the amount that you pay for your gallon of milk. There are many ways that farmers can supplement their income; one is by using the milk to produce other products. This is referred to as value added products such as cheese, ice cream, and yogurt.



The Milk

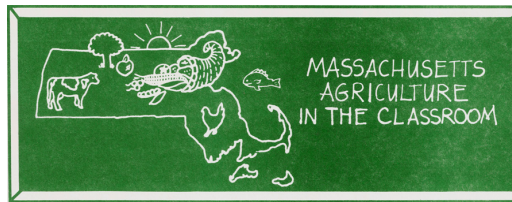
To understand the pricing of the milk, first it is important to understand the economics of the cows themselves. Cows are milked two or three times per day using automatic milking machines, or by hand. The temperature of milk as it comes from the cow is about the same temperature as the human body. Milk is carried through stainless steel pipes to refrigerator tanks which cool the milk to 34 degrees F. Some dairy farmers process their own milk and sell it at the farm. Most sell the milk to a dairy processing plant. Insulated trucks will transport the milk to a processing plant where it will be pasteurized and packaged. The farmers are paid for the milk based on the amount of butterfat, protein and other solids. The two most popular breeds of dairy cows, Holsteins and Jerseys, have differing levels of milk production. The Holstein produces a large volume of milk but her count of butterfat, protein, and other solids is low compared to the Jersey, who gives much less milk but tests with a higher count in these three categories. The Jersey is also a smaller animal and she consumes one third less feed than the Holstein, which also factors into the economics.

The young heifer is a non-milking member of the herd until her first calf is born. The farmer has been raising the heifer for two years. Like all animals, cows must have water and they must be fed. The farmer needs to grow grass and corn to feed the cows or purchase feed for the cows from another farmer who grows extra feed. Grain which is purchased from other farms can amount to 50% of the cost of feeding the cows.

The farmer must provide shelter from cold, moist days in winter. During this time of year, the cows must be fed more grass (hay) and corn in order to produce more body heat. Shelter from the sun in summer and plenty of water help keep the cow cooler. Large animal veterinaries provide routine herd health checks and provide medication in cases of illness.

* Dairy Lesson supported by a grant from the Massachusetts Dairy Promotion Board

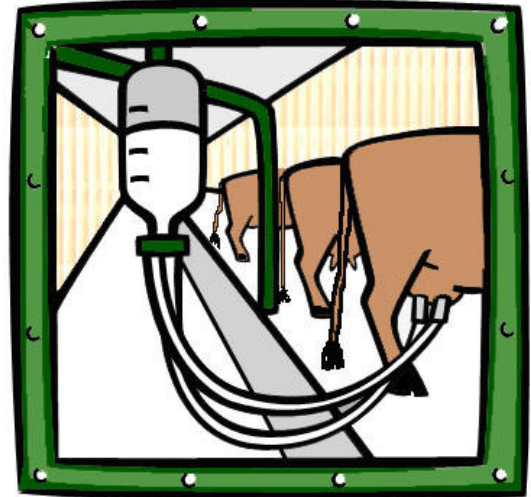




Farmers must hire workers to assist in caring for cows, buildings, machinery and fields, especially if they do not have a lot of family members to assist. The cost of land, planting and harvesting, grain, machinery, buildings and workers add up to a capital intensive business from which the farmer must make a living and hopefully make a little profit so that the farm will thrive and continue into future years

Value-Added Dairy Products

The farm is traditionally just the starting place for a huge and diversified agricultural industry. One of five jobs in the United States is related to the food industry. Food grown on the farm is transported, processed, packaged, stored and distributed to the market for sale to the public. Public Health officials are inspecting facilities and handling techniques as food travels from farm to consumer. As this diversified agricultural system has grown, the farmer's share of each dollar that the consumer pays for farm-raised products has decreased. The U.S.D.A (United States Department of Agriculture) Economic Research Service reported that in the year 2000 farmers received only 20 percent of the food market, with the other 80 percent going to those who transported, processed, stored, distributed, advertised and marketed the foods.



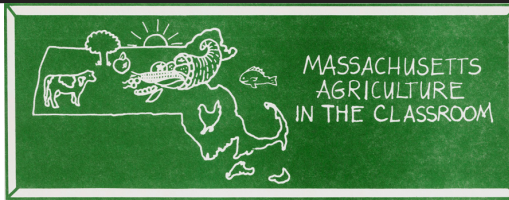
The approximately 80 cents of every dollar that farmers must pay to others can be broken down like this:

- 39 cents goes to pay the workers who handle the farm products after they leave the farm, these include assemblers, manufacturers, wholesalers, retailers (including grocery store workers) and workers in eating places.
- 9 cents goes to pay for packaging.
- 4 cents goes to pay for transportation — moving raw materials to storage and processing facilities, distribution centers and, finally, to the grocery store or restaurant.
- 3 cents goes to pay for electricity, natural gas, and other fuels used in food processing, wholesaling, retailing, and running food service establishments.
- 4 cents is profits earned by the businesses that manufacture and sell the food.
- 4 cents goes to pay for advertising food products on TV and radio and in newspapers and magazines.
- 5 cents goes for depreciation — the cost of repairing or replacing old equipment and buildings.
- 4 cents goes to pay rent for warehouses and other facilities for processing and selling food.
- 8 cents goes to pay for interest on loans, business taxes and other miscellaneous expenses.

(Adapted from Oklahoma Agriculture in the Classroom)

* Dairy lesson supported by a grant from the Massachusetts Dairy Promotion Board.





Adding value to an agricultural crop offers the farmer the opportunity to capture a bigger share of the consumer's food dollar. Farmers can increase the economic value and consumer appeal of an agricultural crop or commodity through changes in processing or diversification. Value may be added by changing the physical state or form of the product, changing production practices in a manner that enhances the product's value or by physically defining and segregating an agricultural commodity or product to result in enhancement of its value. These changes allow farmers the opportunity to market a unique product, fill a market niche, simplify the supply chain, provide a service or lower costs. New products, enhanced product characteristics, brand names, services or unique customer experiences may create additional value.

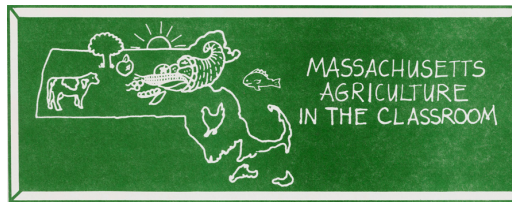
By changing the way a commodity is marketed, farmers add value to raw agricultural products in a non-traditional way in order to command a higher price. The farmer might sell his crops at a farm stand, to special processors, to a local school or restaurants or at a farmers' market. Changing the form of a commodity before it is marketed, farmers add value by transforming raw agricultural products through processing.

This provides the opportunity to market differently. Although additional costs are incurred, a higher profit margin covers these costs. Selling milk directly to the consumer requires pasteurizing, packaging, and displaying, but the farmer is able to capture 100 percent of the consumer's dollar. Changing the way a commodity is packaged for market: Package design is important. It must capture the consumer's interest, have perceived value and meet the consumer's need in terms of size or quantity. Unique, special occasion or gift-ready items bring a higher price, especially if they offer a connection to the land or complement tourism by giving visitors something to share back home. Growing a commodity for a special market: Ethnic- or culture-oriented consumers are a fast growing value-added market. Immigrants also have influenced the diets of other Americans. Organic, free-range and pasture-fed production meat offers diverse tastes and dietary needs adding value. Adding a new enterprise: A new enterprise is any change in a product or service. This includes growing the commodity for a special niche market, growing a crop for a special industry such as cosmetics or medicine or switching crop practices to appeal to a distinct market. Farmer may add entertainment or educational attractions such as petting zoos, farm workshops and tours, nature walks, wedding facilities or picnic sites. Reducing Costs: Farmers may band together to reduce cost by selling or transporting crops cooperatively. Others bundle two or more different crops to create a desirable product.



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Keys to Success

Success in introducing value-added agriculture to the farm rests on producing a unique, high quality product or experience that consumers will desire and want to buy. It also rests on hard work, research, good business planning, record-keeping and constant evaluation. Farmers may want to focus on a niche. The value-added product or enterprise must be unique to succeed in the long-run. A product or service that is not unique and distinctive will quickly be copied thus losing its competitive edge. Farmers can emphasize what is special about their product by linking it to their farm, it's history or their special growing and production practices. People are also hungry for a connection to the earth. Farms offer the experience of farm life while also providing fun, peace and relaxation.

The value-added product or service should also be high-quality. Consumers want fresh, better-tasting, clean, reliable and healthy products. They know it when they taste it! Value-added agriculture should be demand-driven. Farmers must get to know their customers, learn their preferences and produce what those customers want to buy.

Adding Value to Milk

Coopers' Hilltop Farm in Leicester sells all of the milk that their cows produce directly to consumers as pasteurized and homogenized fluid milk. In addition their customers may purchase other items from the store at the farm. Cheese, butter, eggs, bread, ice cream, etc. are purchased by the Coopers for resale. In September 2013 their price for a gallon of milk is \$ 4.40.

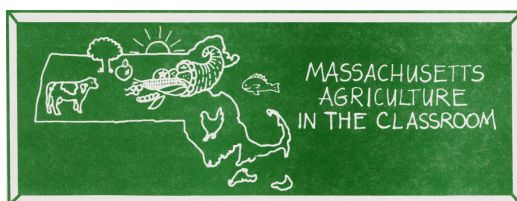
Other farms and agribusinesses may choose to add value to milk by turning it into ice cream. At Bliss Brothers Dairy in Attleboro, ice cream is made in 500 gallon vats and then poured into half-gallon or 3-gallon containers. There are 42 ounces of ice cream in a half gallon container of their high quality vanilla ice cream and 225 ounces in the 3 gallon container.

The vanilla ice cream is composed of 81.95% milk products (milk, cream and dried milk). It contains .4% vanilla. The rest is stabilizers and sweeteners such as sugar, corn syrup and gelatin.

Bliss Brothers Dairy sells a half gallon of ice cream retail for \$5.79 and wholesale for \$4.00. The three gallon container is sold retail for \$28.00 and wholesale for \$21.00. A single scoop ice cream cone or cup is sold for \$2.50 and contains six ounces of ice cream.

* Dairy lesson supported by a grant from the Massachusetts Dairy Promotion Board.





DAIRY ECONOMICS LESSON

Grade Level: Grade 3 - 4

Lesson/Activity Description

In this lesson, students will learn about the economics behind their favorite dairy foods.

Guiding Question

How can farmers supplement their income by creating value added products?

Big Idea

For some farmers selling milk wholesale works well. Others choose to sell milk on their own. All dairy farmers seek projects that will increase their income.

Learning Objectives

- To understand the economics behind dairy farming.

Materials

- White paper
- Construction paper
- Markers/colored pencils
- Dairy Dollar Worksheet

Preparation

Review Background material above.

Introducing the Lesson

Show the following video from the Massachusetts Dairy Production Board (http://www.youtube.com/watch?v=_GQIERrbhQ). Discuss the information about milk prices and introduce the idea of value added products.

Activate prior knowledge

Talk to students about some of their favorite dairy foods. How many of these foods come directly from the farm and how many come from the store?

* Dairy Lesson supported by a grant from the Massachusetts Dairy Promotion Board.





Engage Student Interest:

Discuss with students if they know the advantages of selling directly to customers instead of selling to someone else who sells the product to customers. (If you sell directly to customers you keep more of the profit).

Procedure

Total time approximately. 30 minutes

1. Illustrate the difference between selling directly to customers versus selling to processors etc. Have the students fold a piece of paper in two and write 100 cents on the top of each column, or use Dairy Dollar Worksheet. In one column read off the sample expenses of a farmer from the background information until you are down to 20 cents, which represents the 20 cents per dollar a farmer earns. Have the students subtract each amount until you get to the 20 cents. Student may follow along with the worksheet.



If the farmers sell their Value Added Product directly to the consumer at the farm, he/she will have more control over costs and will be able to limit some expenses. To show this, use the second column on their paper and go through the calculation again. This time leave out the expenses that would go to off farm production and sales. Explain that although it appears the second option has greater profit, it also requires more work on the part of the farmer.

2. Ask students to imagine a new dairy product that can be processed from milk. Have them name their new product and its source, describing the processing steps. Design the package to sell it. Decide where to sell it, identify who would buy it and why, design advertising and price it.

Wrap up

Have the students share their products. Display their products around the room and asks students to discuss if they would want to buy the different products.

Assessing Student Knowledge

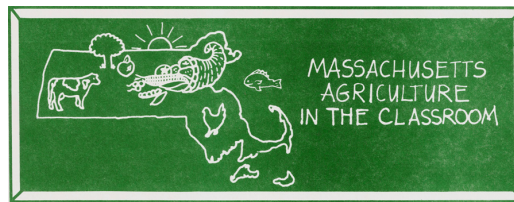
For homework, have the students explore their own food choices and food prices. Ask them to write down the prices of different dairy products and calculate how much of that cost farmers receive.

Extensions

Interview a local dairy farmer about the economics of dairy farming. Get a rough idea of their expenses and how they choose to make a profit, whether it is strictly by the pool or value added products.



* Dairy lesson supported by a grant from the Massachusetts Dairy Promotion Board.



* Some of the Massachusetts Department of Education Standards in this lesson *

Math:

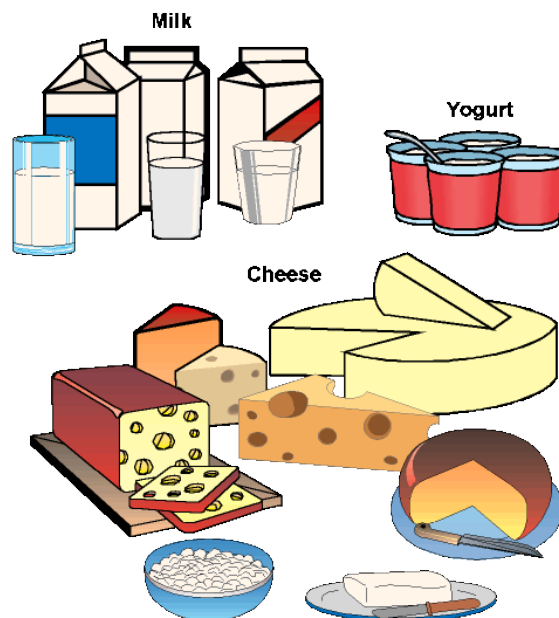
Grade 3 - 4:

Operations and Algebraic Thinking:

8. problems involving the four operations, and identify and explain patterns in arithmetic.
8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.

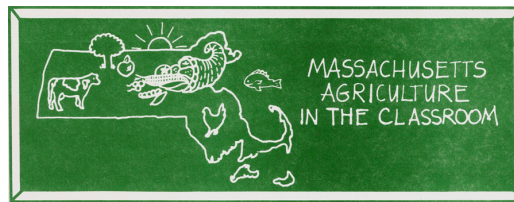
Speaking and Listening:

1. Participate in collaborative conversations with diverse partners about appropriate topics and texts with peers and adults in small and larger groups.



* Dairy lesson supported by a grant from the Massachusetts Dairy Promotion Board.





Resources

Massachusetts Dairy Promotion Board

<http://massdairy.com>

New England Dairy & Food Council

<http://newenglanddairycouncil.org>

National Dairy Council

<http://www.nationaldairycouncil.org>

MAC Newsletter Winter 2004 Dairy Farming

<http://www.aginclassroom.org/Newsletter/winter2004.html>

MAC Newsletter Autumn 2005 Value Added Agriculture

<http://www.aginclassroom.org/Newsletter/fall2005.html>

Extra Cheese, Please! Mozzarella's Journey from Cow to Pizza. By Cris Peterson, Boyds Mills Press, 1994.

Hooray for Dairy Farming! By Bobbie Kalman, Crabtree Publishing, 1998.

USDA Northeast Marketing Area <http://fmmone.com/>

Oklahoma Agriculture in the Classroom "Food Dollars and Cents"

<http://oklahoma4h.okstate.edu/aitc/lessons/primary/money.pdf>

Center for Dairy Excellence

<http://www.discoverdairy.com/>



* Dairy lesson supported by a grant from the Massachusetts Dairy Promotion Board.



Name:

Date:

Dairy Dollars



Keep track of your expenses to see how much profit a dairy farmer makes on every dollar you spent on milk products.

- 1) The workers who handle the farm products after they leave the farm receive 39 cents.

I started with \$ 1.00 . Now I have \$ _____.

- 2) Packaging costs 9 cents.

I started with \$ _____ . Now I have \$ _____.

- 3) Moving dairy products to processors, grocery stores, restaurants, etc, cost 4 cents.

I started with \$ _____ . Now I have \$ _____.

- 4) Fuel for food processing, wholesaling, retailing costs 3 cents.

I started with \$ _____ . Now I have \$ _____.

- 5) Businesses that manufacture and sell the food receive 4 cents.

I started with \$ _____ . Now I have \$ _____.

- 6) Advertising on the radio, TV, and in magazines costs 4 cents.

I started with \$ _____ . Now I have \$ _____.

- 7) Repairing old equipment and buildings on the farm costs 5 cents.

I started with \$ _____ . Now I have \$ _____.

- 8) Rent for warehouses and other buildings that store the food cost 4 cents.

I started with \$ _____ . Now I have \$ _____.

- 9) Taxes, interest of loans, and other expenses cost 8 cents.

I started with \$ _____ . Now I have \$ _____.

For every dollar I spend on a dairy product, the farmer who produces the milk receives approximately \$ _____.