

Dairy Economics in Massachusetts (Middle School- Pre Field Trip)

Background:

There is more to the price of milk than most people realize. Not only do farmers not control the price of milk at the supermarket but they also do not receive the full amount that you pay for your gallon of milk.

The Milk

First we will discuss the economics of the cows themselves. Cows are milked two or three times per day using automatic milking machines or by hand. Milk is carried through stainless steel pipes to refrigerator tanks which cool the milk to 34 degrees F. Insulated trucks will transport the milk to a processing plant where it will be pasteurized and packaged. Some dairy farmers process their own milk and sell it at the farm. Most sell the milk to a dairy processing plant. 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 milking of the cows is important, but before the milk is even milked from the cow there are expenses related to the cow to consider. The cows have water and must be fed, thus the farmer needs to grow his own crops to feed the cow or purchase feed for the cows. They need a shelter to live in and veterinary services when they are ill. The farmer must pay people to take care of the cows and to help with the milking. Once the milk has been transported from the cow, the farmer must have the facilities to store the milk. These are only a fraction of the costs that farmers pay in order to provide inexpensive food for the consumer. Dairy is also a business however and farmers need to make money take care of themselves and their families as well as the cows.

Milk Prices Decoded

A minimum price to be paid for 100 pounds of milk purchased from the farmer is set each month by the Federal government. This price is set by the Federal Milk Marketing Administration. This minimum price must be paid for the milk that the farm sells to a dealer to be pasteurized, homogenized and made into other dairy products. The price changes monthly and depends on sales from the previous month. Prices for Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New Jersey, Delaware, Maryland, Southeastern Pennsylvania, and the eastern portion of New York are set in Boston under Federal Order #1.

Milk is priced per hundred pounds. Ten gallons is approximately 100 pounds, thus there are 20 half gallons, 40 quarts and 80 pints. The Federal Milk Marketing Orders throughout the United States are charged with keeping a constant supply of inexpensive milk available to everyone

This lesson was created with support of the Massachusetts Dairy Promotion Board in collaboration with Massachusetts Agriculture in the Classroom.

while providing a fair price to all dairy farmers. To calculate milk prices, regulators begin with milk containing 3.5% butterfat, 2.99% protein and 5.69% other solids, which is the milk used to process foods like cheese.

Under the Federal Orders there are four classes of milk. The chart below explains each of the different classes.

Class I	Beverage milk (milk with a 3 week shelf life) including whole milk, lowfat, skimmed, chocolate, strawberry, etc.
Class II	Cream, Ice Cream, Yogurt, and Cottage Cheese
Class III	Cheese, Evaporated and Condensed Milk
Class IV	Butter, Nonfat and Whole Milk Powder

The percentage of each class of milk sold in the market varies month to month. These variations affect the price of milk. Specifically these variations affect the Statistical Uniform Price. The SUP is issued every month and is the minimum price which milke dealers must pay to the dairy farmer. The SUP as of May 2018 is \$16.14. To cover expenses, farmers in Massachusetts need the SUP to be approximately \$17. Another factor that determines the price of milk is the distance from Boston the farmer lives. The further from Boston the lower the price. This transportation factor is called the Producer Price Differential .

Lesson Activity Description: Students will use data collected to create different types of graphs to show the impact of dairy on the Massachusetts economy. They will then use the graphs to make inferences about the data shown.

Materials:

- Access to the internet
- Graph paper

Procedure:

1. Split students into groups. Ask students to brainstorm questions they could do research on about economics and dairy farming in Massachusetts, that could be compared to other states. Examples include: How many dairy farms are in Massachusetts? What is the

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Statistical Uniform Price in Massachusetts? What percent of the Massachusetts economy is based off of dairy? When students have determined their question they should research to find data that helps them to answer it. They should also look at data from other states so they can be compared. Website that would be helpful could be the Massachusetts Department of Agricultural Resources and the United States Department of Agriculture. Note: It is important to get data from reliable sources as there are many websites that present incorrect or misleading data.

2. When students have collected the data they should determine which type of graph or chart is appropriate for displaying and analyzing the data. After discussing this with the teacher they should prepare a presentation for the class about the data collect.

Wrap Up: After students have done research and determined the best type of chart to use to display their data, ask them to present their research. What did they learn? What does their data mean? What can their graph or chart show about the data?

Relevant Standards:

- Math
 - 6.SP. A. Develop understanding of statistical variability.
 - 6.SP. B. Summarize and describe distributions.
 - 7. SP A. Use random sampling to draw inferences about a population.
 - 7.SP. B. Draw informal comparative inferences about two populations.
 - 8.SP. A. Investigate patterns of association in bivariate data.