Class Starters & Enders

Making the Most of Instructional Time
Five Minute Lessons

Class Starters and Enders help utilize the last minutes of class when a lesson ends but there is not enough time to start another, or for an interest approach at the beginning of class. Mini-lessons correlate to GPS in the programs areas below.

Don't Cry Over Spilled Milk!

Program Areas: Animal Science, Healthcare Science, Food Science

Instructions: Read the material and make notes of important points, answer questions, and be ready to discuss this topic.

In the USA, the average person drinks 83.9 liters of milk per year. Like most foods and beverages, cartons of milk are stamped with "sell by" dates before they hit grocery store shelves. Milk can be kept and consumed or used in making other food past its **sell by date** if it is properly refrigerated. But how is that possible?

Milk in stores is stamped with a sell-by date, but the process of pasteurization helps milk last slightly longer once it's at home in your refrigerator.

Milk lasts longer because of a process called **pasteurization**. Pasteurization was first tested by Louis Pasteur and Claude Bernard on April 20, 1864. Now the process is commonplace and regulated by the United States Department of Agriculture. The goal of pasteurization is to reduce the number of viable **pathogens** so they are less likely to cause disease. However, allowing milk to sit out and get warm causes bacteria that was not killed in pasteurization to grow and spoil the milk.

Pasteurization helps milk last longer using heat processing; typically with temperatures below boiling since high temperatures curdle or spoil the milk. The most common form of milk pasteurization is High Temperature Short Time, or **HTST**. In this method of pasteurization milk is forced between metal plates or through pipes heated on the outside by hot water. The milk is heated to 161°F for 15 to 20 seconds. HTST pasteurization kills 99.999 percent of viable microorganisms in milk such as yeast, mold, and common spoilage bacteria. Milk pasteurized this way has a shelf life of two to three weeks. The HTST pasteurization process must be designed so all the milk is heated evenly and no part is subject to a shorter time or lower temperature. Milk can be made to last even longer with ultra-high temperature – or **UHT** – processing, which holds the milk at a temperature of 275°F for a fraction of a second. This helps the milk to last two to three months. UHT processing can slightly change the flavor of milk, so it is less common in the industry.

Review

1. _____ and _____ first tested pasteurization.
2. What is the goal of pasteurization?
3. Why are temperatures below boiling used to pasteurize milk?
4. What does HTST stand for?
5. At what temperature and for how long is the milk heated in HTST pasteurization?
6. How does milk pasteurization relate to healthcare?
7. What does UHT stand for?
8. At what temperature and for how long is the milk heated in UHT pasteurization?
9. Compare and contrast HTST and UHT pasteurization.
10. How many liters of milk does the average person in the USA drink per year?

Language Connection

Define the following terms

HTST Processing
Pasteurization
Pathogens
Sell By Date
UHT Processing

Science Connection

Draw or create a diagram of either the HTST or UHT pasteurization process and explain step-by-step how milk goes from the farm to the grocery store.

Georgia CTAE Resource Network - Written by Cate Buchanan and Dr. Frank B. Flanders, Ed. D.