

Buttering Up!

What Is *IT!*

What do all of the following have in common?

Soy milk, goat's milk, almond milk, coconut milk, rice milk, and cow's milk. They all claim to be milk! But what is really "milk"? Did you know that milk has been used historically since about 10,000 B.C. and now is a significant ingredient in many foods and drinks?

Milk is made up of a mixture of proteins, fats, water, minerals, carbohydrates (sugars), and many other important molecules. It typically comes from the mammary glands of various animals. This would account for cow's milk, goat's milk, and sheep's milk. However, a substance with similar physical and nutritional characteristics of mammal-based milk can be made from various seeds or fruits.

Think About *IT!*

Is it really "milk"?

There has been an ongoing controversy around using the term "milk" in advertising. For many years dairy farmers, chemists, and agricultural engineers have been debating whether or not plant-based milk can be called "milk." Research and comparisons of different kinds of milk have been conducted to determine whether or not the term "milk" should be removed from products such as almond milk, soy milk, and rice milk because they do not derive from the mammary glands of an animal. Others find that because plant-based milk has similar nutritional and physical characteristics, they could be classified as, well, "milk!" What do you think?

Fill halfway, each of three separate, clean jars with equal amounts of different milk. Shake the jar vigorously over a designated period of time and record the changes within the jars. Separate the liquid from the solid in the jars. Taste the solid by-product of the substances on crackers. Using the end of a straw, drop a sample of the liquid on your tongue. Record your findings in the chart provided.



Materials List:

- (3) Small Jars of the Same Size with Lids
- (3) Small Bowls
- Heavy Cream
- Regular Milk
- Almond Milk
- Soy Milk
- Straws
- Crackers
- Popsicle Stick or Butter Knife
- Stop Watch

Extend *IT!*

Create an infographic that visually compares the characteristics of the different kinds of milk you tested. An infographic presents a set of images, charts, graphs, and text to represent an overview of a complex topic in a more understandable way. These poster-like resources are typically colorful and striking to the eye. An infographic should communicate the information simply and at a glance.

Using the information gathered in your exploration of different milk, create an infographic poster to share your findings regarding the characteristics of the milk.

Dare to Change *IT!*

How can your understanding of milk by-products help a manufacturer design a new line of gourmet flavored butter?

Scenario: A local manufacturer would like to launch a new line of gourmet flavored butter. They are seeking the help of local consumers and culinary engineers to come up with the best tasting recipes. The butter manufacturer would like the new butter line to be a very creamy and flavorful butter. In addition to the different flavors, the butter should be suitable for different uses, such as seasoning meats, adding a little extra flavor to slices of bread, or as a way to enhance the taste of various vegetables.

Challenge: How can your understanding of milk and its by-products help the manufacturer design a unique flavor of butter to improve the flavor of meat, bread, and vegetables?

Suggested Resources and Articles:

Doheny, Kathleen. ["Food Fight: So, What Is 'Milk'?"](#) WebMD, July 30, 2018.

["What is milk?"](#) Alberta Milk.l

McVean B.Sc., Ada. ["Chemically How Does Milk Become Butter?"](#) McGill Office of Science and Society, Sept 22, 2017.

Cassetty, RD, Samatha. ["Plant-based milk vs. cow's milk: What's the difference?"](#) NBC News, Feb 7, 2018.

Yoder, Kate. ["The FDA is confused about the definition of 'milk,' so we talked to a dictionary expert."](#) Grist, July 30, 2018

The Stay at Home Chef. ["How to Make Homemade Butter in a Mason Jar."](#) YouTube, July 14, 2017.

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