

# MOO MOO BUTTER



## Introduction:

In this activity, students will be obtaining butter from cream. But where does butter come from? Ask the question, and you are likely to get responses ranging from the "the grocery store" to "from a cow".

As the students go through the activity, they will observe the phase changes, and understand the process that leads to butter, from start to finish.

## Guiding Questions:

**Preparation:** What is butter?

**Development:** How do you think butter is made?

**Integration:** Do you think butter is made the same way at home as in a factory? Do you think there is any benefit to making butter at home?

## MELS Progression of Learning

Living Things

D. Systems and Interactions

4. Food Production Techniques

a. Describes the main steps in the production of various basic foods (e.g. making butter, bread, yogurt)

Material World

2. Mixtures

**Length:** 60 minutes

**Season:** All

**Level:** Primary, cycle 1,  
years 1 and 2

**Broad Area of Learning:** Environmental awareness and consumer rights and responsibilities.

**Educational Aim:** To encourage students to develop an active relationship with their environment while maintaining a critical attitude towards exploitation of the environment, technological development and consumer goods.

**Focus of development:** Awareness of social, economic and ethical aspects of consumption.

- b. Distinguishes between mixtures of miscible and immiscible liquids (e.g. water and milk, water and oil)
- 3. Solid, liquid, gaseous state, phase changes
  - a. Distinguishes among the three states of matter (solid, liquid, gas)
  - d. Determines the state of various objects and substances in his/her environment (e.g. glass, air, milk, plastic)



## Background about butter :

Butter is made from cream because cream has more fat than milk. In fact, cream is the fatty layer that collects on top of milk that is not homogenized. Homogenization is a mechanical process by which the fat is broken down into tiny droplets. The milk we drink must be homogenized or the milk fat globules will not remain mixed in with the rest of the milk.

Butter is produced through the following steps:

**Step 1-Milk collection at farms:** Milk is collected from dairy cows at farms.

**Step 2-Separation:** The cream (fat) is separated from the milk.

**Step 3-Pasteurization:** The cream is heated to kill bacteria that is present in the cream.

**Step 4- Aging:** The cream is aged to develop its flavor.

**Step 5-Churning and draining:** The cream is churned so the fat particles bunch together, forming butter, The leftover liquid is drained and is called buttermilk.

**Step 6-Working:** The butter is formed into a brick shape and is then packaged in foil . It is now ready to be shipped to the store!

For a quick overview of what the stages entail, check out the How It's Made: Butter video (see resources).

### Materials:

- Plastic jars with well closing lids that won't leak (washed peanut butter jars with screw on top work well)
- Marbles
- 35% whipping cream at room temperature
- Measuring cup
- Watch/ clock
- Sieve
- Salt (to taste)
- Small bowl
- Small glass
- Spoon
- Several Scales

### Did you know?

It takes a total of 10.2 L of cow's milk to make 1 lb. of butter!





### Preparation :

1. Take the cream out of the fridge 30-60 minutes before beginning the activity.
2. Print out sufficient copies of annexe 1 and 2 (one of each for each student).

### Pre-activity:

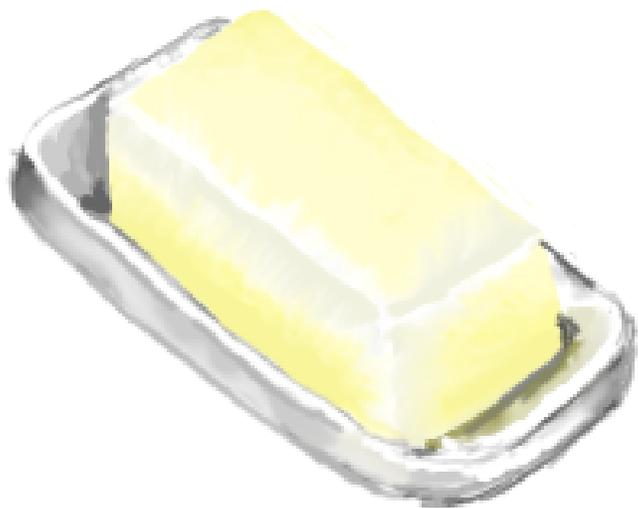
1. Have a group discussion about where butter comes from.
2. As a class, discover the steps in butter production, by playing the youtube video (see resources in annexe 1)

For additional information, go to Butter Through the Ages:

<http://www.webexhibits.org/butter/process-steps.html>

### Activity:

1. In front of the class, measure 150 ml of 35% whipping cream.
2. Pour the cream into a plastic jar.
3. Add the marbles (2 or 3) to the jar and put the lid back on, making sure it is put on tightly enough that no liquid will come out.
4. Shake the jar vigorously, in an upward and downward motion. Pass it on from student to student, 20 seconds each.
5. Ask students to listen for the sound of the marbles and let you know when they hear a change in sound.
6. When the marbles are no longer making noise, open the jar and observe the result.
7. Put the lid back onto the jar and continue shaking until the students can hear the marbles again, as well as a liquid sloshing around.
8. Open the jar once more, and observe the result.
9. Pour the jar's contents through the sieve





### Post activity and evaluation:

1. Have students fill in the matching worksheet (annexe 1).
2. Ask the students if they think there are different kinds of butter. Write their ideas on the board.

Perform a taste test with various kinds of butter: salted, non salted, whipped, with herbs etc. What differences/similarities do the students recognize?

To demonstrate to students how the cream separates from non-homogenized milk, pour some vegetable oil and water into a clear container that has a lid (a Mason jar will work well). Have the students lightly shake the jar. The oil (which represents the cream) will always separate and rise above the water (which represents the milk).



### What's happening when the marbles make less noise?

Heavy cream is an emulsion, a combination of fat drops in the liquid part of cream, called buttermilk. This part is mostly water. The tiny fat droplets don't really mix with the water, but rather are floating in the liquid. When you shake the cream, the fat drops come together, and stay together. They get bigger and bigger, forming a chunk of butter.

# Activity: From cream to butter



Annexe 1

Exercise: Identify the different states

liquid - gas - solid

Cream

Butter

Buttermilk

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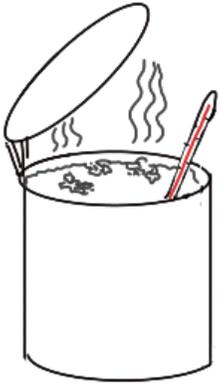
# Activity: Steps of Butter Production

Match each step (1 to 6) to the right order of the butter making process.

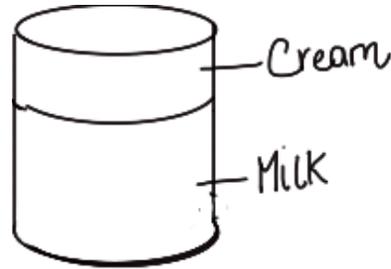


Annex 2

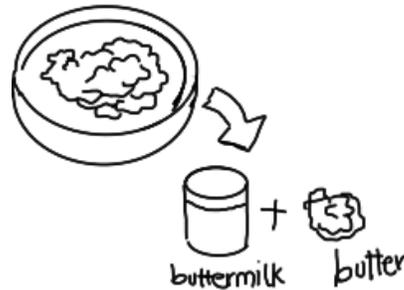
**Pasteurization:** The cream is heated to kill bacteria that is present in the cream.



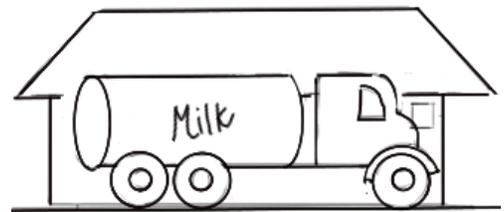
**Separation:** The cream (fat) is separated from the milk.



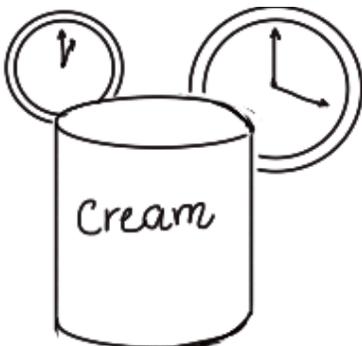
**Churning and draining:** The cream is churned so the fat particles bunch together, forming butter. The leftover liquid is drained and is called buttermilk.



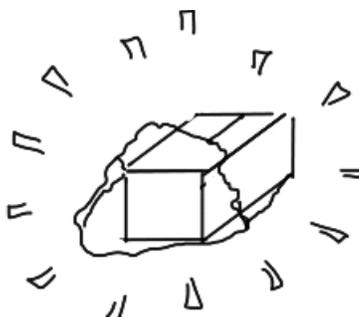
**Milk collection:** Milk is collected from dairy cows at farms



**Aging:** The cream is aged to develop its flavor.



**Working:** The butter is formed into a brick shape and is then packaged in foil. It is now ready to be shipped to the store!



Step 1

Step 2

Step 3

Step 4

Step 5

Step 6



## Resources

1. How it's made: butter  
(<https://www.youtube.com/watch?v=qwb2uZLSLhw>)
2. Dairy Goodness Website (<https://www.dairygoodness.ca/butter>)
3. JumpStart Website  
(<http://www.jumpstart.com/common/make-your-butter>)
4. Butter Through the Ages:  
<http://www.webexhibits.org/butter/process-steps.html>