

Churning Butter

Collect

- 1 Cup heavy whipping cream
- Clear glass pint jar with a tight lid, or a few baby food jars
- Spatula
- Bowl
- Cold water
- A clock (optional)



Making a Butter Churner

1. Leave the cream out until it reaches room temperature.
2. Fill the jar halfway with cream and screw the lid on very tight.
3. Shake the cream and observe its viscosity (how thick or thin it is).

What is cream made of?

Cream comes from milk. Milk is produced by all mammals and contains water and fat, as well as other nutrients such as protein and calcium. Since fat is less dense than water, milk will separate if left to sit. Once the small fat globules float to the top, the fatty cream layer can be skimmed off.

Shake, shake, shake!

4. Check the time and start shaking the cream. Taking turns with a friend is best.
5. Notice the cream starting to foam and thicken. You made whipped cream!
6. Keep shaking and observe changes.

What is happening to the cream?

The tiny fat globules inside the cream repel one another. This keeps the tiny beads of fat separate as the cream sloshes around. When you start to really shake the cream, you add energy to the mix. The globules smash together and join up into bigger and bigger globs of fat. As they get bigger, the globules have a harder time moving past each other. You can feel that change as the cream gets thicker and thicker.

Making Butter

7. Stop shaking the jar once you see a solid clump in the center of the jar surrounded by a thin milky liquid. Don't forget to check the time! This should take approximately 10 minutes, but will depend on the temperature of the cream.

- Carefully pour the liquid into an empty bowl. This liquid is called buttermilk. You can store it for making buttermilk pancakes or biscuits!
- The remaining solid clump is your butter. To make it more solid, use your spatula to squeeze out any remaining liquid.
- Rinse the butter with cold water, and squeeze out any liquid again.

Did you make a chemical or a physical change?

The cream went through a physical change when it turned into butter. The fat globules clumped together causing the liquid to be squeezed out of the solid mass. This physical change is reversible. The butter can be melted and mixed with buttermilk to make cream again.

Taste It!

- Spread your butter on bread, pancakes, potatoes, or corn!
- Store your homemade butter in the fridge. Since fat is airtight, bacteria have a hard time growing on butter, so butter lasts longer than milk or cream.

Results

How long did it take for the fat globules to come together and form butter?

Can you engineer a device that could shake the cream without your own muscles and energy?

Experiment with cold cream and see if it takes a shorter or longer time to make butter.

