

Churning Butter

Collect

- 1 cup heavy whipping cream
- Glass jar with lid
- Spatula
- Bowl
- Cold water
- Stopwatch (optional)

Get shaking

1. Leave the cream out until it reaches room temperature.
2. Fill the glass jar about halfway full with cream and screw the lid of very tight.
3. Shake the cream and observe its viscosity—how thick or thin it is.

Keep on shaking

1. Start the stopwatch and continue shaking the jar of cream. If you can, take turns with a friend so your arm doesn't get so tired. It will take about 10 minutes of shaking for butter to form.
2. Notice the cream starting to foam and thicken. That's whipped cream!
3. Keep shaking and observe the changes.

Butter up

1. Stop shaking the jar once you see a solid clump in the center of the jar surrounded by a thin milky liquid. It should have taken about 10 minutes for this solid clump of butter to form, but the amount of shaking needed will depend on the temperature of the cream.
2. Carefully pour the liquid into an empty bowl. This liquid is called buttermilk. You can store it for making buttermilk pancakes or biscuits!
3. The remaining solid clumps is your butter. To make it more solid, use your spatula to squeeze out any remaining liquid.
4. Rinse the butter with cold water and squeeze out any liquid again.

Tasting time

1. Spread your butter on bread, pancakes, potatoes, or corn—you've earned it!
2. Store your homemade butter in the fridge.

What's happening?

The cream went through a physical change when it turned into butter. As you started to shake the cream, you added the energy need to create this change. The fat globules smashed together and joined up into bigger and bigger globs of fat. As the globules got bigger, they clumped together causing the liquid to be squeezed out of the solid mass. You can feel that change as the cream got thicker and thicker.

This physical change is reversible. The butter can be melted and mixed with buttermilk to make cream again.

Take it further

Analyze the results of your timing. How long did it take for the fat globules to come together and form butter? Experiment with cold cream and see if it takes a shorter or longer time to form butter.

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