

MAKING BUTTER AT HOME – you will get solid butter and liquid buttermilk, but, who will get there first?

Conduct this experiment with a family member, friend, or classmate at home.

Materials needed: Heavy whipping cream at room temperature
 Refrigerated heavy whipping cream
 Two clear jars with screw top lids
 Timer
 A pencil and paper to record your findings

1. Fill one jar about 1/3 full with heavy cream at room temperature.
2. Screw the lid on very tightly.
3. Fill the other jar about 1/3 full with refrigerated heavy cream.
4. Screw the lid on very tightly.
5. Give one participant a jar with room temperature cream and the other participant a jar with refrigerated cream.
6. Shake the jars back and forth for five minutes.
7. Note how the heavy whipping cream in each jar changes.
8. Rigorously shake the jars for another five minutes.
9. Compare what each jar looks like inside and note the findings.
10. The cream has little globs of fat and protein. When you shake the jar, the fat and protein hit each other and stick together, forming a larger and larger glob. That glob is butter! The leftover liquid is buttermilk.
11. Overall, how long did it take butter to form using room temperature heavy cream compared to refrigerated heavy cream?
12. Does temperature affect how quickly cream turns into butter?
13. Remove the lump of butter from each jar and place it in a bowl of cold water, kneading the butter to remove any extra liquid. Drain the liquid from the bowl and rinse it two more times. (If the liquid is not removed, the butter will turn rancid.)
14. Place the rinsed butter on a plate.)
15. As you shook each jar, you should have seen that the cream was very much a liquid, initially sloshing around the jar. Soon, the sloshing slowed as the cream thickened. Within a couple of minutes, it should have thickened up a great deal so that it didn't move much as you shook the jar. At this point the cream had likely turned into whipped cream. After you shook the jar for about five to 20 minutes total, the cream should have abruptly turned into butter.
16. This likely happened much quicker for the room-temperature cream than for the colder cream. As the cream is shaken, the fat molecules get out of position and clump together, eventually clumping so much that butter forms. At this point the fat molecules have clearly separated from the liquid in the cream. When molecules are heated, they move faster because they have more energy. Consequently, the molecules in the room-temperature cream moved faster than the ones in the chilled cream, allowing the room-temperature fat molecules to clump together faster, thereby forming butter faster.
17. Taste a sample from each jar. Do they taste the same? Note your findings.
18. Now enjoy a tasty snack of bread spread with some of your freshly made butter and a few gulps of buttermilk, just like children in the Cadman-White family did back in the 1700s!