



Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences –particularly students of color and girls – by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at www.projectexploration.org/stemathome.

In this activity, you will:

Explore the science behind temperature and fat molecules and how they affect the butter-making process.



Supplies Required:

2 cartons of heavy whipping cream; 1 room temperature and 1 cold
2 Large glass jar
Bowl
Optional: salt, cinnamon, brown sugar, honey, garlic powder, spices or herbs
Bread
Spoon

Video

Learn how to make butter in a jar: <https://tinyurl.com/yb26ojcm>

Overview

Butter is an ancient prepared food, having been made by people at least 4,000 years ago. One traditional butter-making process begins with making cream. When whole milk sits out, tiny fat molecules float to the top, forming a layer of cream that can be skimmed and collected. To make butter, the cream is agitated (stirred up) so that the fat molecules get shaken out of position and clump together. Eventually, after enough agitation, the fat molecules clump so much that butter forms. When this happens, the fat molecules have clearly separated from the liquid in the cream, and this liquid can be removed and made into buttermilk. When molecules are heated, they move faster because they have more energy. Consequently, the molecules in the room-temperature cream move faster than the ones in chilled cream, allowing the room-temperature fat molecules to clump together faster, thereby forming butter faster.



Instructions

1. Have an adult to assist if you need help measuring and shaking!
2. In a medium to large mason jar add the ROOM TEMPERATURE heavy whipping cream, and fill jar about 3/4 full. Label the jar "Room Temperature".
3. In a second medium to large mason jar add the COLD TEMPERATURE heavy whipping cream, and fill jar about 3/4 full. Label the jar "Cold Temperature".
4. Secure lids tightly on jars.
5. Shake jars vigorously, stopping every 5 minutes to make observations. Shake until firm.
6. Pour the liquid (buttermilk) that separates into another bowl. (You can use this to make lots of recipes! See below.)
7. Taste your butter!

Additional Resources

Think About It! How long did it take for the butter to form? How did the heavy whipping cream change as you shook the jar? Do you think you will get the same results if you change the temperature of the butter? Explain your thinking.

1. What's the difference better butter and margarine? <https://tinyurl.com/jrprf7t>
2. Fun recipes to make with kids: <https://tinyurl.com/tdwmm9v>
3. Yummy recipes to make with your buttermilk: <https://tinyurl.com/yasps8ys>

Share It Out

Share on social media: Use your butter in another recipe and tag your favorite chef or food star! How does your butter compare to butter you buy at the grocery store? Explain the science behind butter and share using the hashtags:

#ButterInAJar
#ProjectExploration
#StemAtHome

Share via PE's website: Students who complete STEM@home activities and share what they learned with the PE team via our website will earn points which can be traded in for cash prizes at the Explore Store. Your project number is 223. Learn more at www.projectexploration.org/explore-store

Join PE's character contest!

Design a STEM character who will lead kids through activities and be featured on our website and in our STEMbooks. Cash prizes will be awarded to the top 3 finalists.

Learn more at:
www.projectexploration.org/character-contest.



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