Homemade Butter

Activity from Kelsey Lichtenwalner, Livestock Agent

Background information Butter is made from cream, a component of milk. Cream is lighter than the rest of the milk and floats to the top, where it can be skimmed off and packaged separately. **One pound of butter can be made from the cream found in ten quarts of milk.** The more butterfat milk contains the more butter it will make. The Jersey breed of dairy cattle produces milk with the highest percentage of butterfat. The Holstein breed gives the greatest quantity of milk, but with the lowest percentage of butterfat.

What is happening during the butter making process? To make butter from the cream, the cream is agitated (stirred up) so that the fat particles get shaken out of position and clump together with other fat particles. The clumping first allows tiny air bubbles to be trapped in the cream, forming a light and airy product you might have had, called whipped cream. But if the agitation is continued, the fat particles start to clump so much that the air can no longer be held by the cream, and butter forms. As you can probably see now, butter is basically the milk's fat. By time the butter forms from the cream, the fat particles have clearly separated from the liquid in the cream. This liquid can be removed and made into buttermilk. (Science Buddies Staff. (2013, November 16). Shaking for Butter. Retrieved October 17, 2014 from http://www.sciencebuddies.org/science-fair-projects/project_ideas/FoodSci_p050.shtml)

Materials Needed

- Jar (pint-sized)
    - **Note** for individual butter making, consider using smaller containers.
- Heavy whipping cream, preferably at room temperature
- Salt (optional)
- Crackers

Procedure

1. Fill container 2/3 full with heavy whipping cream. Firmly secure the lid.
2. Share the container briskly for 5-10 minutes (the more cream in the container, the longer it will take). Continue shaking until the butter is a solid lump in the jar. Once the butter has formed, open the jar and pour off the buttermilk. See the attached **“What’s Happening”** worksheet to engage students in making observations

during the butter making process.
3. To make salted butter, add salt just before the butter is formed.
4. Spread butter on crackers and enjoy!
5. For extra points: try the recipe a couple more times using different milks. What is the difference in the outcome.

Extension Activities (Extra Point Option)

1. Try salting before shaking- How does this change the outcome of the butter? Does it impact the butter making itself?
2. Experiment by recording the temperature of cream when beginning and at 5 minute increments. How does it change and why?
3. Record the length of time and number of shakes it takes for butter to form.
4. Instead of using heavy whipping cream, try using light cream, whole milk and 2% milk. Compare results.

Additional Resources

- How It's Made – Butter - video
- North Carolina Dairy Information from NCSU- Discover NC Dairy
- Dairy Ag Mag
    - Ag Mags are 4-page, colorful agricultural magazines for kids. They contain information about agriculture, bright pictures, classroom activities and agricultural careers. Ag Mags come in classroom packs of 30 and can be purchased from wisagclassroom.org

TYPE OF MILK	BEGINNING	5 MINUTES	END
Heavy Whipping Cream			
Light Cream			
Whole Milk			

2% Milk			
Salted Milk			

Post Activity Evaluation Form

Education Standards

Common Core: RI.2.1 Next Generation Science 2-PS1-1, 2-PS1-4
AFNR: AS1.a.2.e, AS4.a.1.e, FPP1.a.1.e, FPP3.a.2.e, FPP3.a.4.e