

FOR BUTTER'S SHAKE!



Introduction:

In this activity, students will be transforming cream into butter. The process involves shaking the cream enough to separate the fat from the liquid (known as buttermilk).

Students will be able to measure and compare the quantities between their original cream, and their final butter products.

Length: 60 minutes

Season: Spring and Fall

Level: Primary, cycle 2,
years 1 and 2 (3rd and 4th)

Guiding Questions:

Preparation: Where does butter come from?

Development: What are the steps to follow to make butter?

Integration: Do you think there are any benefits to making your own butter at home? Give examples and explain your answer.

Broad Area of Learning: Environmental awareness and consumer rights and responsibilities.

Educational Aim: To encourage students to develop an active relationship with their environment while maintaining a critical attitude towards exploitation of the environment, technological development and consumer goods.

Focus of development: Awareness of social, economic and ethical aspects of consumption.

MELS Progression of Learning

Living Things

E. Techniques and instrumentation

2. Use of simple measuring instruments.

a. Appropriately uses simple measuring instruments (e.g. rulers, dropper, graduated cylinder, balance, thermometer)

Background Information:

Butter is a staple in many homes, and it is a dairy product. This means it is created from cow's milk. While high in fat, butter is a good source of vitamins and minerals. Some people even say some vegetables should be cooked in butter, because it helps your body absorb the nutrients.

We are using cream instead of milk because cream contains more fat. In fact, cream is simply the fatty top layer that collects before the milk is homogenized. Homogenization is a mechanical process by which the fat is broken down into tiny droplets. The milk we drink must be homogenized or the milk fat globules will not remain mixed in with the with the rest of the milk. Cows' milk is rich in fat and it is possible to obtain the most fatty part through mechanical processes like centrifugation- using centrifugal force to separate solid from liquid.

Materials:

- Plastic jars with well closing lids that won't leak (washed peanut butter jars with screw on top work well)
- Marbles
- 35% whipping cream at room temperature
- Measuring cup
- Watch/ clock
- Sieve
- Salt (to taste)
- Small bowl
- Small glass
- Spoon
- Several Scales

Fun Experiment:

To demonstrate to students how the cream separates from non-homogenized milk, pour some vegetable oil and water into a clear container that has a lid (a Mason jar will work well). Have the students lightly shake the jar. The oil (which represents the cream) will always separate and rise above the water (which represents the milk)



Preparation

1. Take the cream out of the fridge 30-60 minutes before beginning the activity.
2. Print out sufficient copies of annexe 1 and 2 (one of each for each student).

Now that the students are able to make butter themselves, they can share it with students in younger grades. Bring some fresh bread for the students to enjoy their butter.



Pre-activity:

1. Distribute the annexes
2. Ask students to fill in KWL sheet (annexe 1)
3. Split up the class into teams of 2
4. Ask students to fill in annexe 2.
5. Allow 10 minutes for students to compare answers and correct the sheets with their partners.
6. Bring the class back together to discuss the answers.

Activity development:

1. Explain to students that they will be preparing butter from cream.
2. Distribute the materials to each team.
3. Give each team a different amount of cream and marbles (100 ml to 350 ml, and 0 to 4 marbles).
4. Allow students to follow the steps themselves. As they complete the activity, they will be answering the questions found in annexe 3.
5. Once the teams finish, ask students to fill

Do a taste testing with various kinds of butter: salted, non salted, whipped, with herbs etc. What similarities/differences do the students recognize?

What's happening when the marbles make less noise?

Heavy cream is an emulsion, a combination of fat drops in the liquid part of cream, called buttermilk. This part is mostly water. The tiny fat droplets don't really mix with the water, but rather are floating in the liquid. When you shake the cream, the fat drops come together, and stay together. They get bigger and bigger, forming a chunk of butter.

Name:

Date:



Annexe 1

Making butter

How is butter made ?

What I know	What I want to know	What I want to learn

Name:

Date:



Annexe 2

Fill in the following chart:

<p>Which dairy products are made with milk?</p>	<p>Where does milk come from?</p>
<p>What is the process to make butter?</p>	<p>Which materials do I need to make butter?</p>

- Share your answers with your partner. With a different coloured pencil, add their answers to your own.
- Share your answers with the class. Once again, in a different colour complete the answers with things you had not thought about.

Name:

Date:



Annexe 3

DURING

1. With the help of a scale, weigh your empty container. How much does it weigh? _____
2. Measure out 150 mL of cream.
3. Pour the cream into your tight closing plastic jar and add 2 marbles. Close your jar tightly.
4. Why do we add the marbles?

5. How long do you think it will take to make butter? Write your hypothesis here: _____
6. When it is your turn, shake the jar in an up-down motion. Make sure to hold on to it tightly with both hands!
7. When you get tired pass it on to your team member for his turn. Make sure everyone has a turn.
8. Listen to the sound made by the marbles. What happens to it as you shake your jar? _____
9. When you no longer here the marbles, stop shaking. Write down how long that took.

10. Open your jar. What do you see?

11. Put the lid back on and continue shaking. It will take some effort, but continue passing the jar around the team until you can hear the marbles again, as well as a sloshing sound (like a liquid) .
12. How long does it take for this to happen? _____
13. Open your jar. What do you see?

14. Empty the jar over the sieve into the glass.
15. What is the name of the liquid that collects in the glass? _____
16. Using the scale, weigh your solid butter. How much does it weigh? _____ grams.
17. Use a measuring cup to measure the remaining liquid. How many milliliters are there? _____ ml.

Name:

Date:



AFTER

Annexe 4

You have witnessed a change of state . Use the word bank to place the appropriate words in the correct place.

liquid - gas - solid - fusion - solidification - vaporization - condensation - sublimation

cream

butter

What lead to the change of state that occurred?

Fill in the following table. Make sure that each team used the same amount of marbles.

Number of marbles used: _____

QUANTITY	My team	Team _____	Team _____	Team _____	Team _____
Cream (ml)					
Butter (g)					
Buttermilk (ml)					
Length of time (minutes)					



What do you think would happen if you added more or less cream to your jar, and kept the same number of marbles? Why?

My hypothesis:

What do you think would happen if you kept the same amount of cream, but increased or decreased the number of marbles? Why?

My hypothesis:
