

# Got Butter?

## Did you know that there are many different types of butter?

Salted, unsalted, whipped, cultured and clarified are all types of butter. Butter is used to cook many different foods. It can be used when baking a cake, sautéing vegetables or even spread on a slice of bread.

Butter comes from milk. Milk is an **emulsion**. When oil and water mix together it is called an emulsion. The fats that are in milk are what we use to make butter. The fat in milk forms a solid. Since fat is lighter than water, the cream will separate and float to the top. Those solids are collected to make butter.

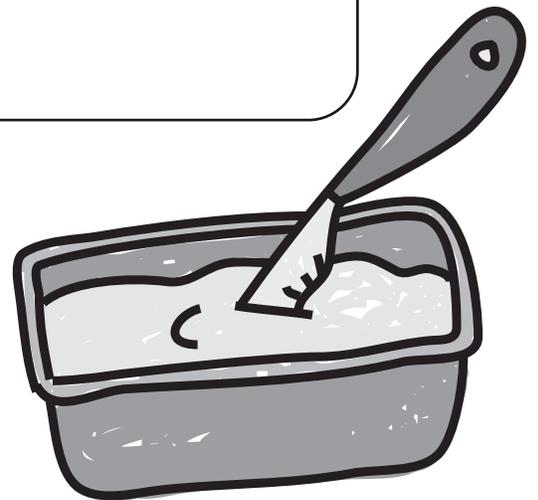
When complete, butter is an emulsion of water in milk fat. It is usually about 80% fat and 20% water. The water in butter helps to keep it moist. About half of the fat in butter is **saturated fat**. Saturated fat comes from animals.

## DOODLE BUGS

In the reading, circle the fat that accounts for about half of the fat in butter.

Draw a box around the name for a mixture of oil and water.

What are the two things butter is made of?



# MATHEMATICS INVESTIGATIONS: Churn the Butter



## Your group will need:

- 1 worksheet
- 1 pencil
- 1 calculator

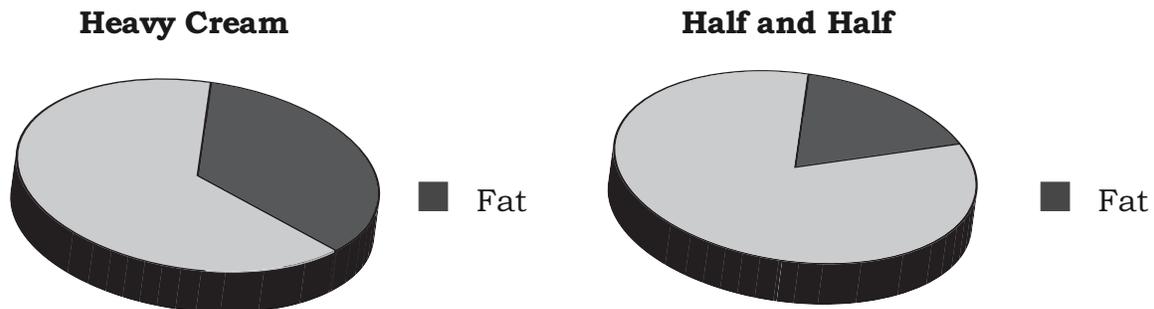
## Things to know:

more fat = better butter

Predict whether you think heavy cream or half and half will take less time to make butter.

**Prediction:** \_\_\_\_\_

## Butterfat Content



1. Which of the products above has more butterfat?

## MATHEMATICS INVESTIGATIONS: **Churn the Butter (continued)**

A classroom has decided to make butter from heavy cream and half and half. They pour  $\frac{1}{2}$  cup of each into separate jars, added a marble and shook their jars until butter began to form. They have recorded the start and finish for each.

### **2. Heavy Cream**

Start Time: 9:30 AM

Finish Time: 9:53 AM

Total Time: (finish time – start time) \_\_\_\_\_

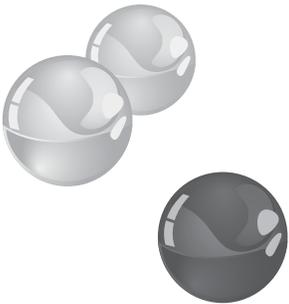
### **3. Half and Half**

Start Time: 10:05 AM

Finish Time: 10:38 AM

Total Time: (finish time – start time) \_\_\_\_\_

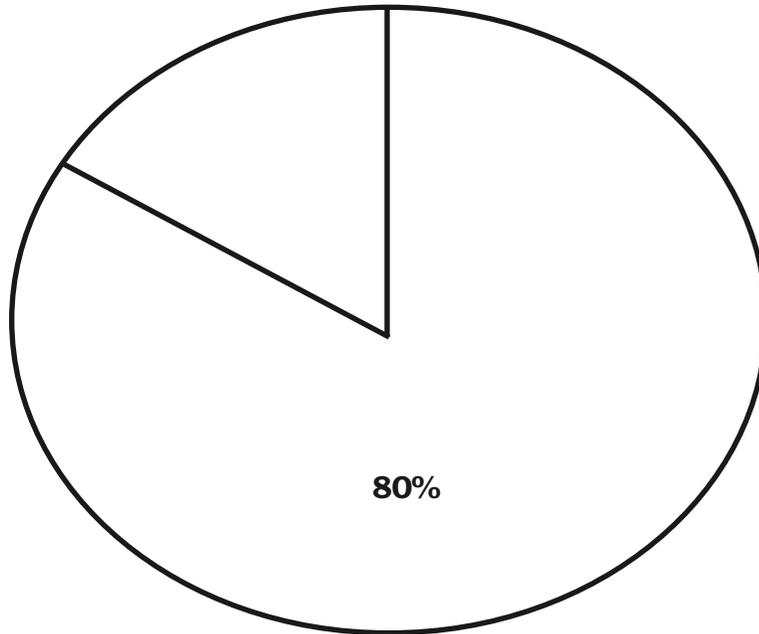
### **4. Which took less time to make butter, heavy cream or half and half?**



MATHEMATICS INVESTIGATIONS:  
**Churn the Butter (continued)**

Use the pie chart below to answer the following questions

**Butter**



5. Correctly label the pie chart with fat and water.
6. What is the fraction of water to fat? (water/fat)
7. If you had 5% less water, how much water and fat would you have?
8. If you had 15% less fat, how much fat and water would you have?

## FUN WITH FOOD: **Old Fashioned Butter**



### **You will need:**

1 plastic or glass jar with lid  
3-4 marbles  
1 bowl

### **PREP TIME: 30 minutes**

$\frac{3}{4}$  cup heavy whipping cream  
Help from an adult  
*Recipe makes  $\frac{1}{4}$  cup.*

You will observe, taste and record the changes that occur as heaving whipping cream turns into butter.

### **Make your own butter!**

1. Pour the heavy whipping cream into your jar.
2. Place the marble in the jar.
3. Shake vigorously until you can't hear the marble moving anymore.
4. Open your jar. With clean hands feel and taste the butter.
5. If it feels like whipped cream, place another marble in and continue to shake.
6. When you can no longer hear the marbles open your jar feel and taste the butter.
7. There will be a white liquid on top, pour it out. That is buttermilk.
8. Rinse the butter until the water is clear and the butter is semi-solid.
9. Pour the butter into the bowl and remove the marbles. It is ready to eat!

### **Fun Fact**

Butter is a saturated fat, it is solid a room temperature. You should limit how much saturated fat you eat each day by choosing foods that include more vegetable oils and have no trans fat. Be sure to look at the nutrition facts label to check the amount of saturated and trans fat.

FUN WITH FOOD:  
**Old Fashioned Butter**

**Record and draw your observations**

1. Describe the whipping cream appearance, texture and taste before pouring into jar.

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2. Describe the appearance, texture and taste of the butter after the first marble stopped making noise.

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3. Describe the appearance, texture and taste of the butter after the second marble stopped making noise.

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4. Describe the appearance, texture and taste of the butter after the buttermilk had been drained.

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# Proficiency Questions

**Circle the best answer:**

- 1. When oil and water are mixed together it is called a(n):**
  - a. emulsion
  - b. solid
  - c. liquid
  - d. none of the above
  
- 2. The type of fat that makes up about half of the total fat in butter is called:**
  - a. unsaturated fat
  - b. trans fat
  - c. saturated fat
  - d. none of the above
  
- 3. If you start shaking your jar of heavy cream at 9:13AM and finish at 9:28AM, how long did it take to make your butter?**
  - a. 5 minutes
  - b. 10 minutes
  - c. 15 minutes
  - d. 20 minutes
  
- 4. If your butter is 70% fat, what percentage water is in your butter?**
  - a. 20%
  - b. 30%
  - c. 40%
  - d. 50%