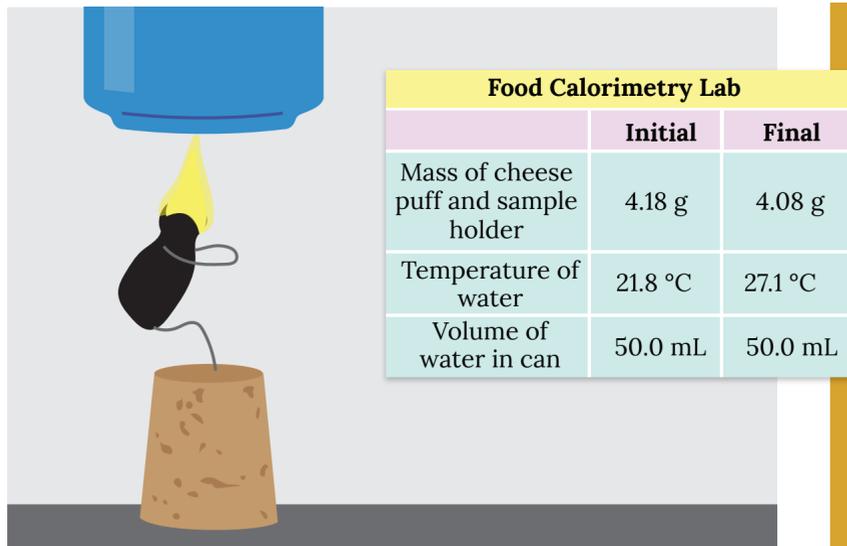


# THE SCIENCE BEHIND Calories

## What are Calories?

Calories are a unit of energy, typically used to describe how much energy is in your food. One calorie is the amount of energy needed to raise 1 gram of water 1 degree Celsius (or Kelvin). With nutrition labels in the United States, calories are listed with a capital C. One Calorie is equal to one thousand calories or one kilocalorie. Depending on the country, you may see nutrition labels with Calories, kilocalories, or even kilojoules.



Food Calorimetry Lab		
	Initial	Final
Mass of cheese puff and sample holder	4.18 g	4.08 g
Temperature of water	21.8 °C	27.1 °C
Volume of water in can	50.0 mL	50.0 mL

## HOW DOES A CALORIMETER WORK?

In Chemistry class, you can determine the amount of calories in various food items with a simple soda can calorimeter. A premeasured amount of water is placed in the soda can calorimeter and the mass of the food item is recorded. The initial temperature of the water is recorded and then the food item is allowed to burn. By measuring the temperature change of the water and the mass of the food that burns, you can determine how many calories were released!

It is a fascinating concept! And all you need to solve for the energy is the specific heat of water, which is 1 cal/g•°C, the mass of the water, and the temperature change it undergoes. You can even compare the energy released by the food to its nutrition label!

On another note, if you want to use Joules as your unit of energy, instead of calories, you can convert it!

**1 calorie = 4.184 joules**

$$Q = m \cdot c \cdot \Delta T$$

energy                      mass                      specific heat capacity                      change in temperature

## Nutrition Label in the U.S.

Nutrition Facts	
1 serving per container	
<b>Serving size</b>	<b>1 Bottle</b>
<b>Amount per serving</b>	
<b>Calories</b>	<b>220</b>
% Daily Value*	
<b>Total Fat</b> 0g	<b>0%</b>
<b>Sodium</b> 75mg	<b>3%</b>
<b>Total Carbohydrate</b> 65g	<b>24%</b>
Total Sugars 65g	
Includes 65g Added Sugars	<b>130%</b>
<b>Protein</b> 0g	
*Not a significant source of saturated fat, trans fat, cholesterol, dietary fiber, vitamin D, calcium, iron, and potassium.	

## Nutrition Label in Europe

NUTRITION INFORMATION			
Per	100 ml	330 ml	RI(%*)
Energy	200kJ/48kcal	660kJ/158kcal	9
Fat	0g	0g	0
of which saturates	0g	0g	0
Carbohydrate	12g	39.6g	14
of which sugars	12g	39.6g	40
Protein	0g	0g	0
Salt	0g	0g	0
*Reference intake of an average adult (8400kJ/2000Kcal)			