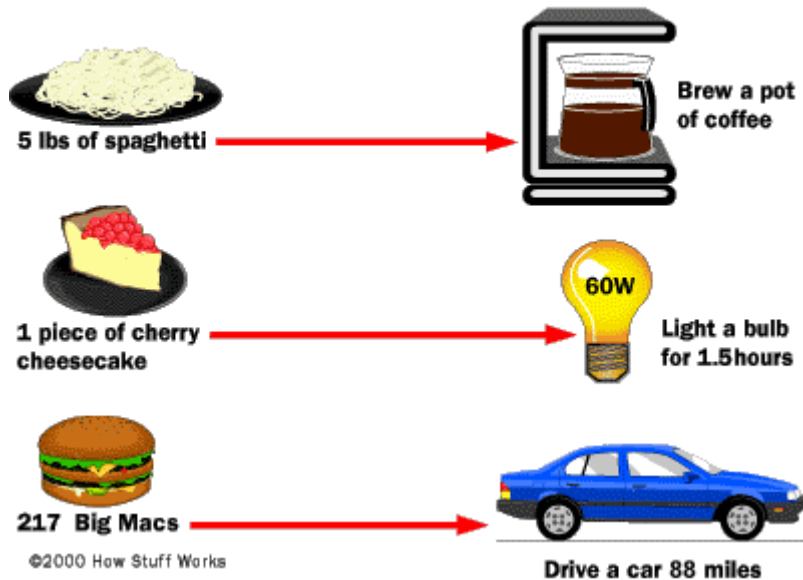


# Understanding Calories

For years now, calories have been all the rage -- people are counting them and cutting them, and you'd be hard-pressed to find something at the supermarket that does not list its calories per serving somewhere on the package. But have you ever wondered what exactly a calorie is?

## The Calories in these items could:



In this article, we'll find out what calories are and why we need them, and examine the relationship between calories and weight.

## What is a Calorie? EAT SMART NOT LESS!!!

A calorie is a unit of energy. We tend to associate calories with food, but they apply to anything containing energy. For example, a gallon (about 4 liters) of gasoline contains about 31,000,000 calories.

Specifically, a calorie is the amount of energy, or **heat**, it takes to raise the temperature of 1 gram of water 1 degree Celsius (1.8 degrees Fahrenheit). One calorie is equal to 4.184 joules, a common unit of energy used in the physical sciences.

Most of us think of calories in relation to food, as in "This can of soda has 200 calories." It turns out that the calories on a food package are actually **kilocalories** (1,000 calories = 1 kilocalorie). The word is sometimes capitalized to show the difference, but usually not. A food calorie contains 4,184 joules. A can of soda containing 200 food calories contains 200,000 regular calories, or 200 kilocalories. A gallon of gasoline contains 31,000 kilocalories.

The same applies to exercise -- when a fitness chart says you burn about 100 calories for every mile you jog, it means 100 kilocalories. **For the duration of this article, when we say "calorie," we mean "kilocalorie."**

## What Is Food

It is safe to say that one thing you'll do today is eat some food -- food is pretty important to all animals. If you don't eat, it can cause all sorts of problems: hunger, weakness, starvation... Food is essential to life.

But what *is* food? What's in food that makes it so important? What happens to the food once you eat it? What is food made of? How does it fuel our bodies? What do words like "carbohydrates" and "fats" really mean (especially on those "Nutrition Facts" labels you find on almost everything these days)? What would happen if

you ate nothing but marshmallows for a week? What is a calorie? Why can't we eat grass like a cow does, or wood like a termite?

If you have ever wondered about food and how your body uses it, then read on. In this article, we'll give you all of the information you need to understand what a hamburger or a banana does to keep your body running every day.

## The Basics of Food

Think about some of the things you have eaten today -- maybe cereal, bread, milk, juice, ham, cheese, an apple, potatoes... All of these foods (and pretty much any other food that you can think of) contain seven basic components:

- **Carbohydrates** (simple and complex)
- **Proteins**
- **Fats**
- **Vitamins**
- **Minerals**
- **Fiber**
- **Water**

Your body's goal is to **digest** food and use it to keep your body alive. In the following sections, we will look at each of these basic components to understand what they really do and why they are so important to your body.

(Note that there might be a few non-food things mixed in with what you eat, especially if you are eating lots of processed foods. Things like artificial colors and chemical preservatives are the most common. Those are **additives**, not part of the natural foods.)

## Preservatives Defined

Because food is so important to survival, food preservation is one of the oldest technologies used by human beings. In this article, we'll look at all of the different preservation techniques commonly used today, including:

- Refrigeration and freezing
- Canning
- Irradiation
- Dehydration
- Freeze-drying
- Salting
- Pickling
- Pasteurizing
- Fermentation
- Carbonation
- Cheese-making
- Chemical preservation

The basic idea behind all forms of food preservation is either:

- To slow down the activity of disease-causing bacteria
- To kill the bacteria altogether

In certain cases, a preservation technique may also destroy enzymes naturally found in a food that cause it to spoil or discolor quickly. An enzyme is a special protein that acts as a catalyst for a chemical reaction, and enzymes are fairly fragile. By increasing the temperature of food to about 150 degrees Fahrenheit (66 degrees Celsius), enzymes are destroyed.

A food that is **sterile** contains no bacteria. Unless sterilized and sealed, all food contains bacteria. For example, bacteria naturally living in milk will spoil the milk in two or three hours if the milk is left out on the kitchen counter at room temperature. By putting the milk in the refrigerator you don't eliminate the bacteria already there, but you do slow down the bacteria enough that the milk will stay fresh for a week or two.

Let's look at all of the different forms of food preservation in detail.

## What Calories Do

Human beings need energy to survive -- to breathe, move, pump blood -- and they acquire this energy from food.

The number of calories in a food is a measure of how much potential energy that food possesses. A gram of carbohydrates has 4 calories, a gram of protein has 4 calories, and a gram of fat has 9 calories. Foods are a compilation of these three building blocks. So if you know how many carbohydrates, fats and proteins are in any given food, you know how many calories, or how much energy, that food contains.

### Caloric Breakdown

- 1 g Carbohydrates: 4 calories
- 1 g Protein: 4 calories
- 1 g Fat: 9 calories

If we look at the nutritional label on the back of a packet of maple-and-brown-sugar oatmeal, we find that it has 160 calories. This means that if we were to pour this oatmeal into a dish, set the oatmeal on fire and get it to burn completely (which is actually pretty tricky), the reaction would produce 160 kilocalories (remember: food calories are kilocalories) -- enough energy to raise the temperature of 160 kilograms of water 1 degree Celsius. If we look closer at the nutritional label, we see that our oatmeal has 2 grams of fat, 4 grams of protein and 32 grams of carbohydrates, producing a total of 162 calories (apparently, food manufacturers like to round down). Of these 162 calories, 18 come from fat (9 cal x 2 g), 16 come from protein (4 cal x 4 g) and 128 come from carbohydrates (4 cal x 32 g).

Our bodies "burn" the calories in the oatmeal through metabolic processes, by which enzymes break the carbohydrates into glucose and other sugars, the fats into glycerol and fatty acids and the proteins into amino acids (see [How Food Works](#) for details). These molecules are then transported through the bloodstream to the cells (see diagram below), where they are either absorbed for immediate use or sent on to the final stage of metabolism in which they are reacted with oxygen to release their stored energy.

## BMR

Just how many calories do our cells need to function well? The number is different for every person. You may notice on the nutritional labels of the foods you buy that the "percent daily values" are based on a 2,000 calorie diet -- 2,000 calories is a rough average of what a person needs to eat in a day, but your body might need more or less than 2,000 calories. Height, weight, gender, age and activity level all affect your caloric needs. There are three main factors involved in calculating how many calories your body needs per day:

- **Basal metabolic rate**
- **Physical activity**
- **Thermic effect of food**

Your **basal metabolic rate** (BMR) is the amount of energy your body needs to function at rest. This accounts for about 60 to 70 percent of calories burned in a day and includes the energy required to keep the heart beating, the lungs breathing, the kidneys functioning and the body temperature stabilized. In general, men have a higher BMR than women. One of the most accurate methods of estimating your basal metabolic rate is the **Harris-Benedict formula**:

- **Adult male:**  $66 + (6.3 \times \text{body weight in lbs.}) + (12.9 \times \text{height in inches}) - (6.8 \times \text{age in years})$
- **Adult female:**  $655 + (4.3 \times \text{weight in lbs.}) + (4.7 \times \text{height in inches}) - (4.7 \times \text{age in years})$

(Note: The first number in the equation for females is, in fact, 655. Strange, but true.)

## Your Caloric Needs

As you now know, there are three main factors involved in calculating how many calories your body needs per day: your BMR, physical activity and the thermic effect of food.

The second factor in the equation, **physical activity**, consumes the next highest number of calories. Physical activity includes everything from making your bed to jogging. Walking, lifting, bending, and just generally moving around burns calories, but the number of calories you burn in any given activity depends on your body weight.

- The **thermic effect of food** is the final addition to the number of calories your body burns. This is the amount of energy your body uses to digest the food you eat -- it takes energy to break food down to its basic elements in order to be used by the body. To calculate the number of calories you expend in this process, multiply the total number of calories you eat in a day by 0.10, or 10 percent.

The total number of calories a body needs in a day is the sum of these three calculations.

## Calories, Fat and Exercise

So what happens if you take in more or fewer calories than your body burns? You either gain or lose fat, respectively. An accumulation of 3,500 extra calories is stored by your body as 1 pound of fat -- fat is the body's way of saving energy for a rainy day. If, on the other hand, you burn 3,500 more calories than you eat, whether by exercising more or eating less, your body converts 1 pound of its stored fat into energy to make up for the deficit.

One thing about exercise is that it raises your metabolic rate not only while you're huffing and puffing on the treadmill. Your metabolism takes a while to return to its normal pace. It continues to function at a higher level; your body burns an increased number of calories for about two hours after you've stopped exercising.

Lots of people wonder if it matters where their calories come from. At its most basic, if we eat exactly the number of calories that we burn and if we're only talking about weight, the answer is no -- a calorie is a calorie. A protein calorie is no different from a fat calorie -- they are simply units of energy. As long as you burn what you eat, you will maintain your weight; and as long as you burn more than you eat, you'll lose weight.

But if we're talking nutrition, it definitely matters where those calories originate. Carbohydrates and proteins are healthier sources of calories than fats. Although our bodies do need a certain amount of fat to function properly -- an adequate supply of fat allows your body to absorb the vitamins you ingest -- an excess of fat can have serious health consequences. The U.S. Food and Drug Administration recommends that a maximum of 30 percent of our daily calories come from fat. So, if you eat 2,000 calories a day, that's a maximum of 600 calories from fat, or 67 grams of fat, per day. However, many doctors and nutritionists now set the maximum number of fat calories at 25 percent of our daily caloric intake. That's 56 grams of fat per day for a 2,000 calorie diet.

Here are some calorie and fat contents that may surprise you:

Food	Serving Size	Calories	Fat Grams
Canola oil	1 cup	1,674	218
Peanut butter	1 cup	1,520	129
Cheddar cheese	1 cup	531	44
Granola	1 cup	270	8
Chocolate syrup	1 cup	837	3
Sugar	1 cup	774	0
Coca-Cola	1 can	140	0

# Understanding the Nutrition Facts Information

## AdvoCare Meal Replacement Shake - Vanilla

### NUTRITION FACTS

Serving Size: 1 pouch (2.08 oz / 59 g) [makes 9 fl oz prepared]

Servings Per Pouch: 1

Amount Per Serving

Calories 220 Calories from Fat 30

		%DV*
Total Fat	3g	5%
Saturated Fat	5%	
Trans Fat	0g	
Cholesterol	40 mg	13%
Sodium	80 mg	3%
Potassium	600 mg	17%
Total Carbohydrate	24 g	8%
Dietary Fiber	5 g	20%
Sugars	12 g	
Protein	24 g	

Calories per gram:

Fat 9 · Carbohydrate 4 · Protein 4

### CALCULATING C:P:F: RATIO

**Fat:** Multiply Total Fat grams by 9:  $3g \times 9 = 27$   
 Divide 27 into Calories (220): 12% **Fat**

**Carbohydrate:** Multiply Total Carb grams by 4:  $24g \times 4 = 96$   
 Divide 96 into Calories (220): 44% **Carbs**

**Protein:** Multiply Total Protein grams by 4:  $24g \times 4 = 96$   
 Divide 96 into Calories (220): 44% **Protein**

AdvoCare Meal Replacement Shake ~ C:P:F: Ratio = 44:44:12

A nutritionally balanced food product will consist of a balance of carbohydrates, protein, and fats. The ideal C:P:F: ratio is identified as 40:30:30. What the C:P:F: 40:30:30 ratio means is 40% of the total calories are derived from carbohydrates, 30% of the total calories are derived from proteins, and 30% of the total calories are derived from fats.



Meal Replacement Shake ~ C:P:F: Ratio = 44:44:12



## BEWARE!!!



**DO NOT LET THE CATCH PHRASES LOW-FAT, SUGAR-FREE, LOW-CARB, DOCTOR APPROVED OR OTHER "MARKETING TECHNIQUES" MISLEAD YOU REGARDING THE FOODS YOU ARE CHOOSING!**

Have you ever calculated the C:P:F: ratio of some of the foods identified in national restaurant chains as "Low Carb"? IT IS **UNBELIEVABLE** WHAT YOU WILL DISCOVER!!! There is good reason why they DO NOT put the Fat content on the menu!

Try it some time! It will be a REAL eye-opener!

## AdvoCare Meal Replacement Shake - Vanilla

### NUTRITION FACTS



Serving Size: 1 pouch (2.08 oz / 59 g) [makes 9 fl oz prepared]

Servings Per Pouch: 1

Amount Per Serving

Calories **220** Calories from Fat 30  
%DV\*

Total Fat **3g** 5%

Saturated Fat **5%**

Trans Fat **0g**

Cholesterol **40 mg** 13%

Sodium **80 mg**  
3%

Potassium **600 mg** 17%

Total Carbohydrate **24 g** 8%

Dietary Fiber **5 g** 20%

Sugars **12 g**

Protein **24 g**

\*Percent Daily Values (DV) are based on a 2,000-calorie diet. Your daily values may be higher or lower depending on your calorie needs.

## CARNATION INSTANT BREAKFAST

### NUTRITION FACTS



Serving Size: 1 pouch (2.08 oz / 59 g) [makes 9 fl oz prepared]

Servings Per Pouch: 1

Amount Per Serving with 1cup Fat Free Milk

Calories **220** Calories from Fat 10  
%DV\*

Total Fat **1g**

Saturated Fat **0%**

Trans Fat **0g**

Cholesterol **1 mg**

Sodium **240 mg**

Potassium **320 mg**

Total Carbohydrate **40 g**

Dietary Fiber **0 g**

Sugars **35 g**

Protein **12 g**

\*Percent Daily Values (DV) are based on a 2,000-calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Notice differences in caloric content!

### CALCULATING C:P:F: RATIO

**Fat:** Multiply Total Fat grams by 9: **3g X 9 = 27**  
 Divide 27 into Calories (220): **12% Fat**

**Carb:** Multiply Total Carb grams by 4: **24g X 4 = 96**  
 Divide 96 into Calories (220): **44% Carbs**

**Protein:** Multiply Total Protein grams by 4: **24g X 4 = 96**  
 Divide 96 into Calories (220): **44% Protein**

A nutritionally balanced food product will consist of a balance of carbohydrates, protein, and fats. The ideal C:P:F: (Carbohydrate:Protein:Fat) ratio is identified as 40:30:30. What the C:P:F: 40:30:30 ratio means is 40% of the total calories are derived from carbohydrates, 30% of the total calories are derived from proteins, and 30% of the total calories are derived from fats.



Meal Replacement Shake ~ C:P:F: Ratio = 44:44:12

### CALCULATING C:P:F: RATIO

**Fat:** Multiply Total Fat grams by 9: **1g X 9 = 9**  
 Divide 9 into Calories (220): **4% Fat**

**Carb:** Multiply Total Carb grams by 4: **20g X 4 = 80**  
 Divide 80 into Calories (220): **36% Carbs**

**Protein:** Multiply Total Protein grams by 4: **12g X 4 = 48**  
 Divide 48 into Calories (220): **22% Protein**

A nutritionally balanced food product will consist of a balance of carbohydrates, protein, and fats. The ideal C:P:F: (Carbohydrate:Protein:Fat) ratio is identified as 40:30:30. What the C:P:F: 40:30:30 ratio means is 40% of the total calories are derived from carbohydrates, 30% of the total calories are derived from proteins, and 30% of the total calories are derived from fats.



Carnation Instant Breakfast ~ C:P:F: Ratio = 73:22:4