



Peanut Power

Peanuts are a good source of energy. When you eat them, your body releases this stored chemical energy, and then converts it into movement via your muscles. We can estimate just how much energy is in a peanut by using it as a fuel to heat up some water.

You will need

- A shelled peanut
- A paperclip or short piece of wire
- Some plasticine or modelling clay
- A clamp stand and clamp
- A food or drinks can, with the top removed
- A thermometer
- A heatproof mat or tray (e.g. a foil pie container)
- A measuring cylinder
- A Bunsen burner or lighter
- Water – at room temperature

Steps

1. Bend the end of the wire into a ring shape, so that the peanut sits snugly in it.
2. Use the plasticine to fix the other end of the wire to the heatproof mat.
3. Measure out 50 cm³ of water in the measuring cylinder, and then pour it into the can. Clamp this about 3 cm above the mounted peanut.
4. Find the mass of the peanut in grams (*Mass A*).
5. Use the thermometer to take a note of the water temperature (*Temp. Y*).
6. Remove the thermometer, and then use the Bunsen flame to light the peanut under the can.
7. Let the peanut burn, until the flame goes out – measure the temperature of the water again (*Temp. Z*).
8. Find the mass of the burned peanut in grams (*Mass B*).



	per 100g
Energy (kJ/kcal)	429/102
Protein (g)	5.0
Carbohydrate (g)	14.3
- of which sugars (g)	14.3
Fat (g)	3.0
- of which saturates (g)	1.7
Fibre (g)	nil
Sodium (g)	0.1

ENRICHMENTS

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Follow-up

To make 1 cm³ of water rise 1°C in temperature requires 1 calorie (or 4.2 joules of energy).

To work out how many calories are in 1 g of peanut, use the following calculation:

Amount of water (cm ³)	X	Temperature rise (cm ³)	÷	Change in mass of peanut	=	Calories in 1 g of peanut
50		(Temp. Z - Temp. Y)		(Mass A - Mass B)		?

To work out how many joules of energy are in a peanut, use the following calculation:

Calories in 1 g of peanut	X	Conversion factor	X	Mass of peanut before burning (g)	=	Energy in peanut (J)
?		4.2		?		?

Compare the energy value you obtained above to that given in the 'nutritional information' panel on a packet of peanuts. Why do you think there is a difference? Where might energy be lost in the experiment?

Try repeating the experiment with different types of nuts (e.g. cashew nuts, brazil nuts, hazelnuts) - which one produces the most energy?