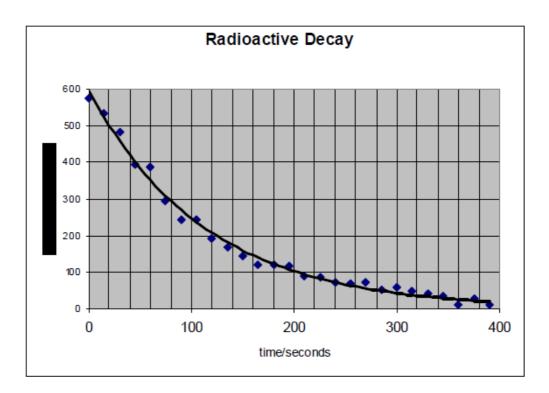
AS-2009 Q10

The graph above plots the measurements of the radioactive decay of an element, along with a line of best fit. Why do some of the data points not lie on the line of best fit, but appear above and below it?



- A Not all of the α or β or γ radiations are measured
- B The source decays in a random manner
- C The background count is not zero
- D Inaccurate measurements by the experimenter

AS-2010 Q4 & Q7 & Q9

4.	The formula for kinetic energy is the same whatever the system of units that are used. In the SI system, the units are metres, kilograms, seconds and joules. In the cgs system, the corresponding units are centimetres, grams, seconds and ergs. The number of ergs in a joule is:					
	A. 10 ⁻⁵	B. 1	C. 10 ⁵	D. 10 ⁷		
7.	In the LEP accelerator at CERN, before the new LHC was constructed in the same tunnel, an electron could be accelerated until it reached a total energy of about 400 GeV ($400 \times 10^9 \text{ eV}$). Estimate which of the examples below has a similar amount of kinetic energy? $e = 1.6 \times 10^{-19} \text{ C}$					
	A. An oxygen molecule moving at 500 m s ⁻¹ (as in air at room temperature)	B. A snail crawling at 2 mm s ⁻¹	C. A house brick that has fallen 100 m	D. An airliner cruising at 500 km hr ⁻¹		
9.	The best estimate of the mass of one cubic metre of air at atmospheric pressure is:					
	A. 1 mg	B. 1 g	C. 1 kg	D. 1000 kg		

AS-2011 Q2 & Q8

2.	A spherical mass m of uniform density has a weight W . If a second mass of similar
	density but with double the radius of the first is compared, the weight of the second
	mass is

A. the same

B. 2W

C. 4W

D. 8W

8. A Big Mac from McDonalds has an energy content of 2.3 MJ (McDonalds Nutrition Guide) and a mass of 214 g whilst a tonne of TNT will release 4.7 x 10⁹ J when detonated. Comparisons can be made by calculating the energy density, which is the amount of energy released in a reaction per unit mass.

What is the ratio

$$1 \text{ tonne} = 10^3 \text{ kg}$$

A. 2.3x 10⁻³

B. 0.23

C. 0.44

D. 2.3

AS-2012 Q2

A 600 W microwave oven can cook a 300 g potato in 9 minutes. How long would it take to cook six 200 g potatoes placed in the microwave at the same time?

A. 9 minutes

B. 18 minutes C. 27 minutes D. 36 minutes

AS-2010 Q11

1.	An archaeologist at an excavation discovers a crown that looks like gold. It has a mass of 546 g and a volume of 34.6 cm³. However, chemical analysis shows that the crown consists of a mixture of gold and silver. Unfortunately the analysis is unable to give the proportions without removing a sample. The problem is to find the mass of gold in the crown. We assume that the volume of the crown is equal to the initial volumes of gold and silver of which it is composed.					
	Density of gold, $\rho_g = 19.3 \text{ g cm}^{-3}$ Density of silver, $\rho_s = 10.5 \text{ g cm}^{-3}$					
a)	Write down an equation relating the masses m_g and m_s of gold and silver in the crown equation for the corresponding volumes V_g and V_s .	and an				
		[2				
b)	Write down an equation for the total mass in terms of the volumes V_g , V_s and densitie the gold and silver in the crown.	s ρ_g , ρ_s of				
		_[1]				
c)	In the equation from (b) substitute for V_s and then substitute for V_g to obtain a relation beto ρ_g , ρ_s and m_g .	ween				
		_				
		_[3]				
d)	Determine the value of the mass of gold, m_g .					
		_				
		_[1]				