

Sample questions: maths in science

At the beginning of each question we have referenced the paper it is taken from, the skill area it addresses and the level of demand (low targets grades 1–3, standard targets grades 4–5 and high targets grades 6–8).

Chemistry 1F

Skill 1c

Low demand

0 5 . 8 A coarse particle has a diameter of 1×10^{-6} m.

A nanoparticle has a diameter of 1.6×10^{-9} m.

Calculate how many times bigger the diameter of the coarse particle is than the diameter of the nanoparticle.

[2 marks]

Physics 1F

Skill 1c

Standard demand

Table 1 shows how the count rate from a radioactive source changes with time.

Table 1

Time in seconds	0	40	80	120	160
Count rate in counts/second	400	283	200	141	100

0 7 . 4 Use **Table 1** to calculate the count rate after 200 seconds.

[2 marks]

Trilogy Physics 1F

Skills 1d, 2c

Standard demand

0 7 . 5 A driver wishes to buy a new car.

Table 2 gives some data about an electric car and one with a petrol engine.

Table 2

	Electric car	Petrol engine car
Cost (£)	27 000	15 000
Running cost per year (£)	250	2 000
Average lifetime (years)	12	12

Which car would be the most economic over its 12 year lifetime?

Use data from **Table 2** to support your answer.

You should include the difference in cost in your answer.

[4 marks]

Trilogy Physics 2F

Skill 2c

Low demand

0 2 . 7 **Table 1** shows some results with a different spring.

Table 1

Force applied in N	Extension in m
0.0	0.000
0.5	0.025
1.0	0.050
1.5	0.075

What would the extension be with a force of 2.0 N?

[1 mark]

Tick **one** box.

0.080 m

0.090 m

0.095 m

0.100 m

Biology 1F

Skill 2h

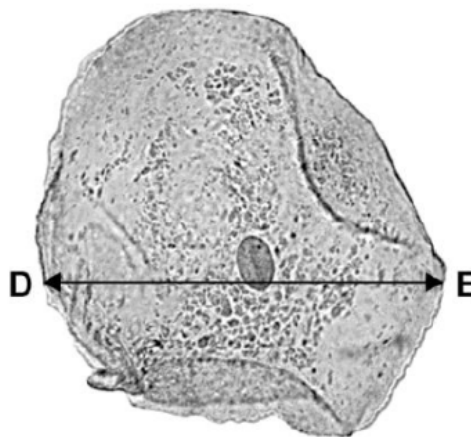
Low demand

0 3 . 5

The cheek cell in **Figure 6** is magnified 250 times

The width of the cell is shown by the line **D** to **E**.

Figure 6



Calculate the width of the cheek cell in micrometres (μm).

Complete the following steps.

[3 marks]

Measure the width of the cell using a ruler _____ mm

Use the equation to work out the real width of the cell in mm:

real size = $\frac{\text{image size}}{\text{magnification}}$ _____ mm

Convert mm to μm _____ μm

Trilogy Physics 2F

Skills 3c, 3d

Low demand

0 2 . 8 The spring constant for the spring in **Table 1** is 20 N/m.

Calculate the work done in stretching the spring until the extension of the spring is 0.050m

Use the correct equation from the Physics Equation Sheet.

[2 marks]

Work done = _____ J

Trilogy Physics 2F

Skills 3c, 3d

Low demand

0 1 . 2 The car travels a distance of 2040 metres in 2 minutes.

Use the following equation to calculate the mean speed of the car.

mean speed = $\frac{\text{distance}}{\text{time}}$

[2 marks]

Mean speed = _____ m/s