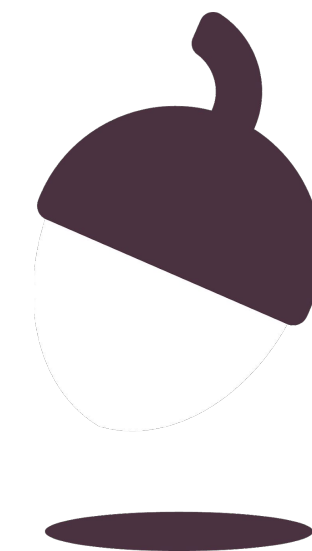Combined Science - Biology - KS4
Cell Biology

Order of magnitude calculations
(Downloadable student document)

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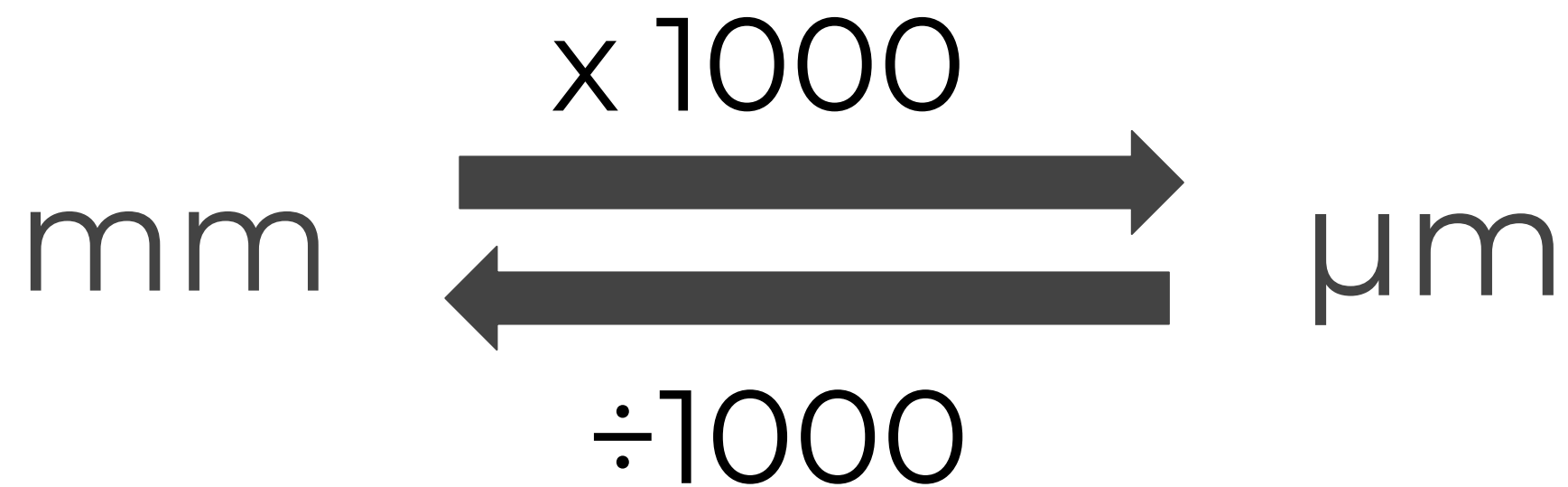
Measuring the width and length of cells.

Measuring width and length using micrometers

1 mm = 1000 μm

To convert mm to µm, you need to multiply the number by 1000.

To convert µm to mm , you need to divide the number by 1000.

x 1000

mm →

µm

÷1000

Converting the units

The point to remember is 1 mm = 1000 μm.

1 mm = 1000 μm

2mm =_____μm

3.4mm =_____μm

Converting the units

The point to remember is 1 mm = 1000 μm.

1 mm = 1000 μm

2mm = **2000** μm

3.4mm = **3400** μm

To convert mm to μm, you need to multiply the number by 1000.

Converting the units from µm to mm
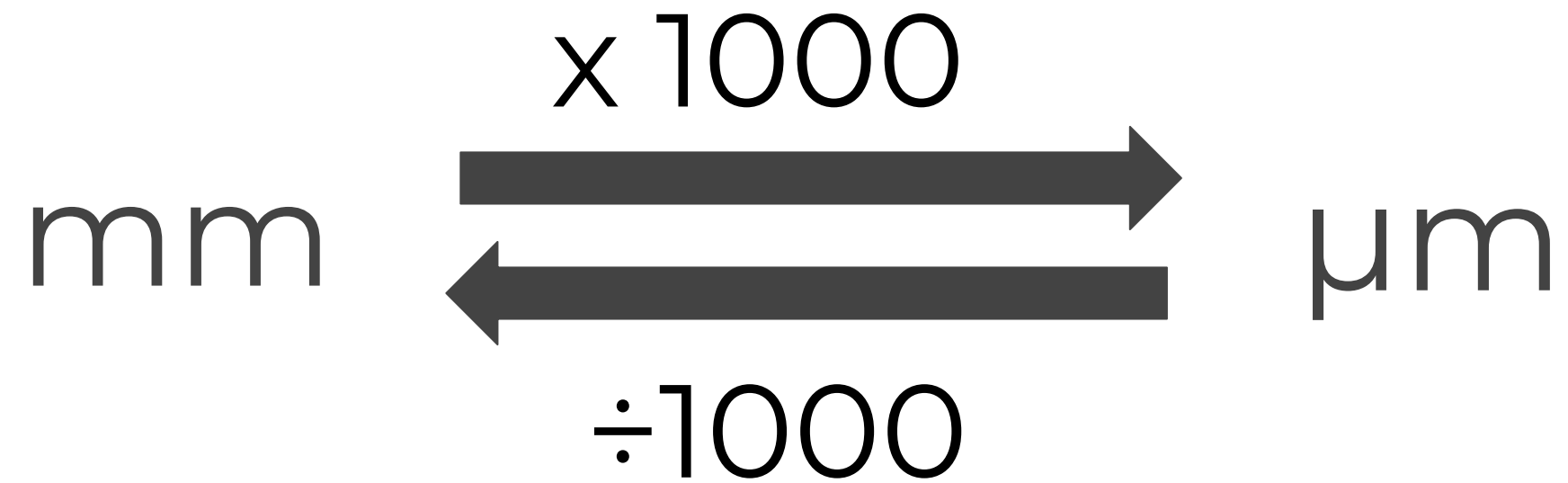
x 1000

mm → µm
    ←
÷1000

1 mm = 1000 µm

_____ mm = 100 µm

_____ mm = 50 µm

Converting the units from μm to mm

x 1000

mm → μm
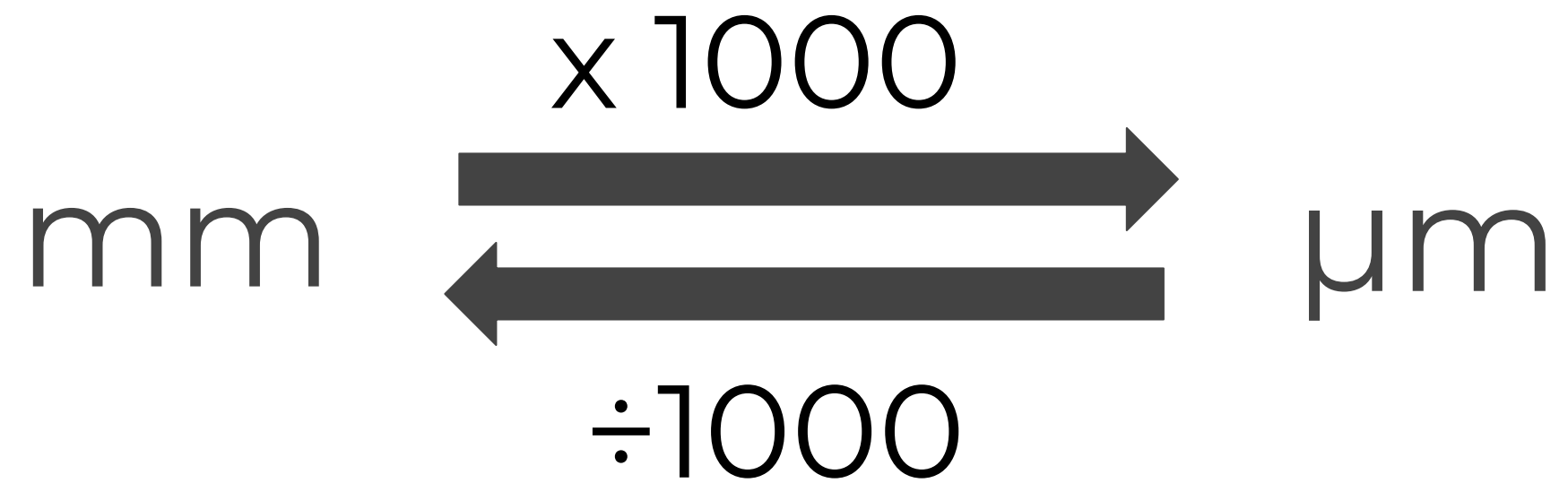
÷1000

1 mm = 1000 μm

0.1 mm = 100 μm

0.05 mm = 50 μm

Expressing large numbers.

Expressing numbers in standard form

We have learnt that 1 mm = 1000 µm.

So, 100mm = _____?_____ µm

100 x 1000 = 100,000µm

We can express 100,000µm in standard form.

$$100{,}000 µm = 1 \times 10^5 µm$$

Order of magnitude and standard form

$10 = 10^1$

$100 = 10 \times 10 = 10^2$

$1000 = 10 \times 10 \times 10 = 10^3$

$100,000\mu m = 10 \times 10 \times 10 \times 10 \times 10 = 10^5 \mu m$

Order of magnitude and standard form

Express 300,000μm in standard form.

Express 70,000μm in standard form.

Order of magnitude and standard form

Express 300,000µm in standard form.

300,000µm = 3 x 100,000µm

= 3 x 10 x10 x10 x10 x10 = 3×10^5µm

Express 70,000µm in standard form.

70,000µm = 7 x 10,000µm

= 7 x 10 x10 x10 x10 = 7×10^4µm

Order of magnitude and standard form

Let's try these two questions together:

1. Express 35mm in μm. Make sure your answer is in standard form.

2. Express 90mm in μm. Make sure your answer is in standard form.

Order of magnitude and standard form

Let's try these two questions together:

1. Express 35mm in μm. Make sure your answer is in standard form. **35mm = 35 x 1000μm = 35,000μm**

35,000μm = 3.5 x 10,000= 3.5 x 10 x10 x10 x10 = 3.5 x 10^4 μm

2. Express 90mm in μm. Make sure your answer is in standard form. **90mm = 90 x 1000μm = 90,000μm**

90,000μm = 9 x 10,000= 9 x 10 x10 x10 x10 = 9 x 10^4 μm

Quick concept check:

Express the following in standard form

$$mm \xrightarrow{\text{X 1000}} \mu m$$
$$mm \xleftarrow{\div 1000} \mu m$$

a) 1000 µm

b) 500,000 µm

c) 6 mm = __?__ µm
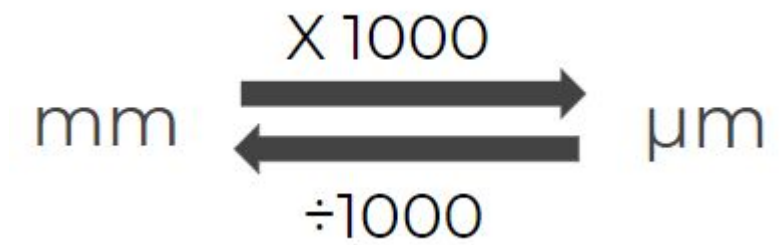
d) 0.5 mm = __?__ µm

Answers to quick concept check:

Express the following in standard form

a) 1000 μm

b) 500,000 μm

c) 6 mm = __?__ μm

d) 0.5 mm = __?__ μm

1×10^3 μm

5×10^5 μm

6×10^3 μm

5×10^2 μm

Expressing small numbers using standard form

Using standard form to express small numbers

There is a cell of 0.00001 μm.

We can also express this in standard form.

$$0.00001 \text{ μm} = 1 \times 10^{-5} \text{ μm}$$

Using standard form to express small numbers

There is a cell of 0.0005 mm.
Express the above in standard form.

There is a cell of 0.007 µm.
Express the above in standard form.

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Using standard form to express small numbers

There is a cell of 0.0005 mm.
Express the above in standard form.

$$0.0005 \text{ mm} = 5 \times 10^{-4} \text{mm}$$

There is a cell of 0.007 μm.
Express the above in standard form.
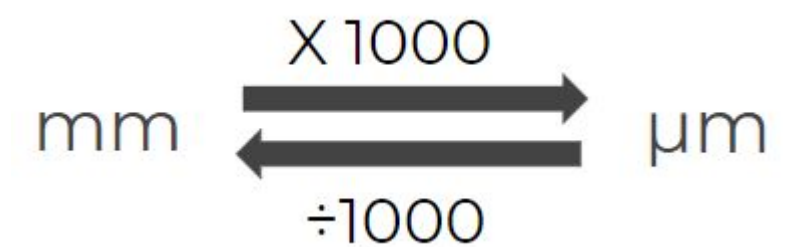
$$0.007 \text{ μm} = 7 \times 10^{-3} \text{mm}$$

Independent practice

Express the following measurements in standard form.

1. 329,000µm = _____µm
2. 0. 0003µm = _____µm
3. 0.0045µm = _____µm
4. 9.5 mm = _____µm
5. 0.00007mm = _____µm
6. 256,000µm = _____mm
7. 0.00034mm = _____µm
8. 183,000 µm = _____mm

X 1000

mm ⟶
⟵ µm

÷1000

Independent practice

Express the following measurements in standard form.

Answers:

1. 329,000μm = _____μm
2. 0. 0003μm = _____μm
3. 0.0045μm = _____μm
4. 9.5 mm = _____μm
5. 0.00007mm = _____μm
6. 256,000μm = _____mm
7. 0.00034mm = _____μm
8. 183,000 μm = _____mm

1. 3.29×10^{5} μm
2. 3×10^{-4} μm
3. 4.5×10^{-3} μm
4. 9.5×10^{3} μm
5. 7×10^{-2} μm
6. 2.56×10^{2} mm
7. 3.4×10^{-1} μm
8. 1.38×10^{2} mm