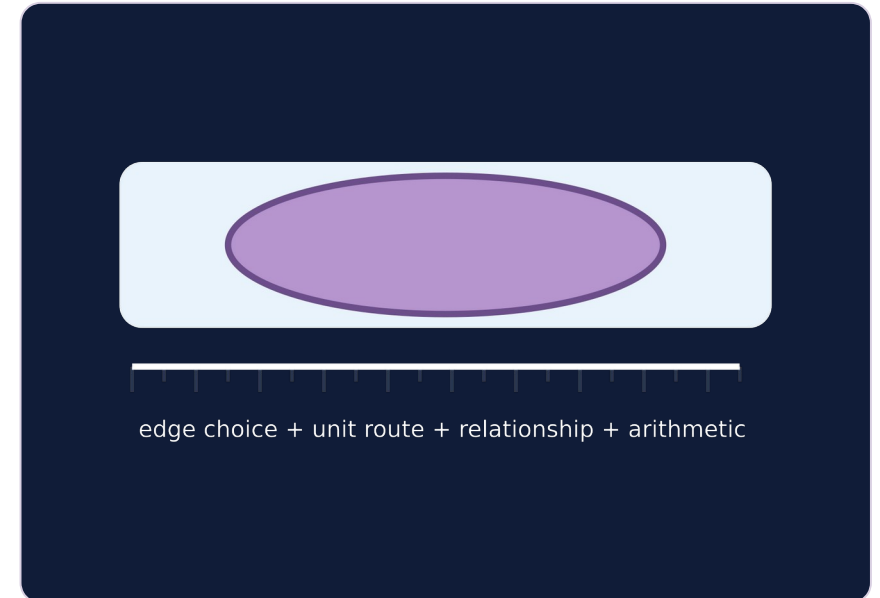


Reading scale bars

I can independently measure, calculate and correct a magnification problem.

Notice. Recall. Be ready to explain.

- 1 Convert 0.08 mm to micrometres.
- 2 Rearrange the relationship to find actual size.



Retrieval answers

Make a prediction

Two pupils get $\times 60$ and $\times 600$ from the same image. Which evidence would help locate the error?

A Only the final number

B Their units and working

C The colour of the image

Commit, then check

Watch the model

- 1 Place the zero mark at the first clear edge and read the second edge once.
- 2 Keep the measured image length and stated actual length in matching units.
- 3 Classify an error as measurement, unit, rearrangement or arithmetic before repairing it.

Read the scale carefully

$$M = \frac{\text{IMAGE SIZE}}{\text{ACTUAL SIZE}}$$

View labelled diagram

Optional video

Choose and justify

A pupil divides actual size by image size and gets $\times 0.002$. What type of error is this?

A Measurement

B Unit conversion

C Rearrangement/relationship

D Rounding

Give the deciding clue before checking.

Check the reasoning

Connect the science

- 1 Do not erase the first route; annotate the point where it became invalid.
- 2 Use the error type to choose one repair, not a full restart.
- 3 Compare the repaired answer with the image scale.

Match units before dividing

$$1 \text{ mm} = 1000 \text{ } \mu\text{m} = 1,000,000 \text{ nm}$$

$$M = I \div A ; I = M \times A ; A = I \div M$$

M is a ratio. I and A are lengths.

Find the first faulty step

Image length = 32 mm. Actual length = 80 μm .

- 1 Sam writes: $32 \div 80 = \times 0.4$
- 2 Point to the first problem.
- 3 Repair it, keeping the first attempt visible.

Reveal shared reasoning

Your independent evidence

A specimen image measures 48 mm. Its actual width is 80 μm . Calculate the magnification. Then explain how you would distinguish a unit error from a measurement error if another pupil obtained $\times 60$.

Optional support

Check the units first. Then check the calculation. For a scale bar, count how many bar lengths fit the cell image.

Make one precise correction to the same work after feedback.

[Open worksheet pages](#)[Model after first attempt](#)

What changed in your thinking?

Name the error type you would check first when an answer is exactly ten or one thousand times too large.

- 1 Point to one improvement in your work.
- 2 Choose what you want to revisit.
- 3 Tell your teacher; agree the next step together.

Retrieval and prediction check

1 80 μm .

2 $A = I \div M$.

Their units and working

[Return to Starter](#)

Check the deciding clue

Rearrangement/relationship

Correct diagnosis. Magnification uses image size divided by actual size.

Compare your reason. Correct one step if needed.

[Return to We Do](#)

Our shared reasoning

The units do not match.

$32 \text{ mm} = 32,000 \text{ }\mu\text{m}$.

$M = 32,000 \div 80 = \times 400$.

Check units before arithmetic.

[Return to shared task](#)

Compare after your first attempt

48 mm = 48,000 μm . Magnification = $48,000 \div 80 = \times 600$. A unit error would be visible if millimetres and micrometres were divided directly or converted by the wrong factor. A measurement error would be checked by realigning the ruler with the specimen edges and measuring again.

Use the model to improve your explanation in your own words.

[Return to independent task](#)

Your lesson resources

Worksheet pages are stored inside this PowerPoint.

[Worksheet · page 1](#)[Worksheet · page 2](#)[Standard PDF](#)[Supported PDF](#)[Depth PDF](#)[Editable Word worksheet](#)[Open online lesson / model](#)

Named files are in this week's folder. Online lesson and video need internet.

[Optional concept video](#)

Worksheet · page 1

Use your printed copy.
Keep the first attempt.

MADE BY MATT / LAUNCH SCIENCE

W3L3 | Find the first faulty step

Friday | 09:30–10:10 | Do | Editable pupil sheet

Name: _____ Date: _____

Core first. Write, speak, point or dictate your own words. Keep the first attempt so you can improve it.

Optional support: Check the units first. Then check the calculation. For a scale bar, count how many bar lengths fit the cell image.

Work together

Read the stated measurements. This route does not depend on the printer scale.

1. A cell image is 48 mm long; the actual cell is 80 µm. Sam writes $48 \div 80 = \times 0.6$. Identify and repair the error.

2. A printed scale bar represents 20 µm. It measures 10 mm on the paper; the cell measures 25 mm. Calculate the cell's actual length.

Return to task

Worksheet · page 2

Continuation is optional.
Improve the same work.

MADE BY MATT / LAUNCH SCIENCE

W3L3 | Continue and improve

Use after the core questions when directed

3. The print is enlarged to 200%. Explain what changes and what stays the same.

Optional transfer

Two pupils judge the same fuzzy image edge differently. Suggest a sensible reporting choice.

Depth: name an assumption or limit, then say what evidence would strengthen your answer.

Improve the same work

One correction I made, and why:

My request for next time: _____

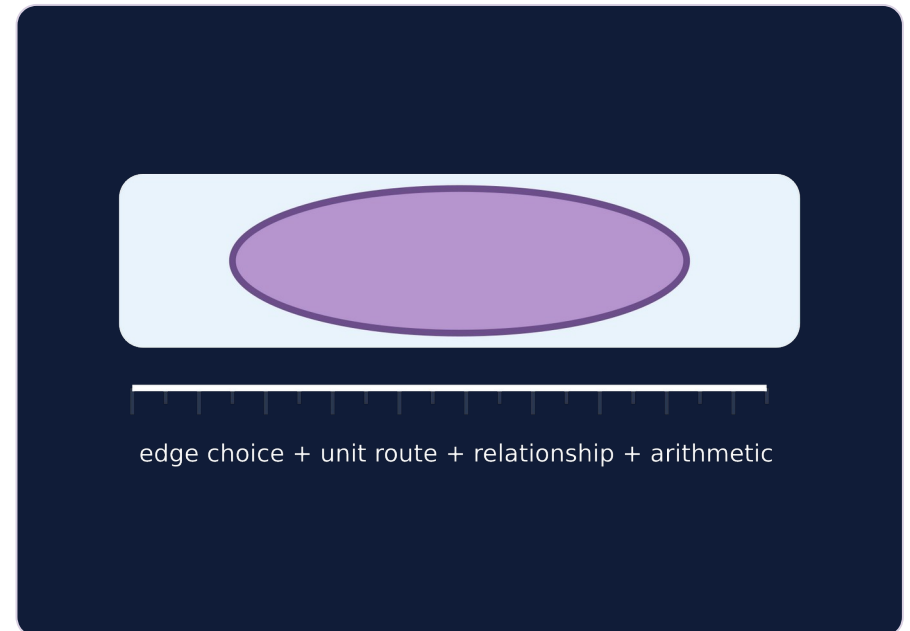
Return to task

Watch, pause and explain

Microscopy

What is the difference between making an image bigger and resolving more detail?

[Play freesciencelessons video](#)



No connection? Use the still model and explain the same question.

Look closely at the model

Four lines, every calculation

- 1 **EQUATION**
mag = image $\div$ actual
- 2 **UNITS CHECK**
both in mm?
- 3 **SUBSTITUTE**
60 $\div$ 0.15
- 4 **ANSWER**
 $\times 400$ (no unit)

Read the command word

► **CALCULATE**
number + working

► **DESCRIBE**
what you see

► **ESTIMATE**
use the scale bar

A model illustration: use the stated data for calculations.

Return to I Do