

Light Microscope

KS3 Biology · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

A microscope has a $\times 10$ eyepiece and a $\times 40$ objective. What is the total magnification?

Step 1 · Recall the rule

Total magnification = eyepiece magnification $\times$ objective magnification.

Step 2 · Substitute the numbers

$$10 \times 40 = 400.$$

Answer: $\times 400$

Check: Multiply, never add: $10 + 40 = 50$ would be wrong.

2. Now try one with the steps

Put these steps for viewing a slide in the right order: fine focus, low-power objective, coarse focus, place slide on stage.

Step 1 · Start safe

Step 2 · Find the image

Step 3 · Sharpen it

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Which part of a microscope do you look through? [1]

2. Which part holds the slide in place? [1]

3. An eyepiece is $\times 10$ and the objective is $\times 4$. What is the total magnification? [1]

4. An eyepiece is $\times 15$ and the objective is $\times 10$. What is the total magnification? [1]
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5. Why should you always start with the lowest-power objective lens? [2]
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6. Why is a stain such added to an onion cell slide? [1]
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7. Why must the specimen on a slide be very thin? [1]
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8. Why do you lower the coverslip at an angle? [1]
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9. How many micrometres (μm) are there in 1 mm? [1]
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10. A cell drawing is 40 mm wide. The real cell is 0.1 mm wide. What is the magnification? [2]
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11. Under $\times 400$ a cell appears 20 mm long. What is its real length in mm? [2]
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12. Convert your answer to question 11 into micrometres (μm). [1]
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13. Give TWO rules for a good scientific drawing of cells. [2]
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14. Hamid says, 'A $\times 1000$ light microscope will let me see a ribosome.' Explain why he is wrong. [2]
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4. Before you hand it in

Adding the lens numbers: $\times 10$ eyepiece and $\times 40$ objective gives $\times 50$.

Multiply: $10 \times 40 = \times 400$.

Using the coarse focus on the ×40 objective.

Use only the fine focus on high power. Coarse focus is for low power.

Dividing sizes in different units, for example 30 mm ÷ 60 µm.

Convert first: 60 µm = 0.06 mm, then $30 \div 0.06 = 500$.

Drawing every cell with shading and colour.

Use a sharp pencil, clean outlines and ruled label lines. Draw a few cells carefully, not the whole field.