AQA GCSE Combined Science Required Practicals Exam Practice Workbook

This exam practice workbook for students following AQA GCSE Combined Science offers targeted practice specifically for the 21 Required Practicals. A variety of practical exam-style questions and terminology in different and unfamiliar contexts builds students' confidence in answering practicals-focused and long-answer questions, and equips students with the skills to secure the 15% practicals requirement in their exams.

Written by practicals expert Primrose Kitten and suitable for both GCSE Combined Science Trilogy and Synergy, this practical-focused workbook contains hints on tackling the practicals questions and tips on how to translate the skills from familiar to unfamiliar settings.

Exam-style questions – A variety of practical exam-style questions tailored to each Required Practical allows students to tackle practical questions across a wide range of contexts

Practical methods – Full details of all 21 Required Practicals, including equipment, method, and safety information, to remind students of the practical work they have carried out and skills they have gained during the course

Remember – Each practical has a reminder of the key skill being tested in their exams practical, whatever the context

Exam tips – Hints on how students can approach practical exam questions, improve their answers, and secure marks

Answers to all questions – All answers are online and can be freely accessed for self-assessment and to check understanding
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1 Microscopy

Use a light microscope to observe, draw, and label biological specimens.

Method

Before you can look at the cells on the slide, you will need to set up your microscope.

Most microscopes have a built-in light source, but if the one you are using does not then you need to arrange the mirror found underneath the stage so that light is directed through the lens system.

1 Move the stage to its lowest position.
2 Place a prepared slide on the centre of the stage and fix it in place using the clips.
3 Select the objective lens with the lowest magnification and raise the stage to its highest position.
4 Look through the eyepiece and slowly move the stage down by turning the coarse focus adjustment until the cells on the slide come into view.
5 Turn the fine focus adjustment to sharpen the focus so the cells can be clearly seen.
6 If you wish to view the object at greater magnification to see more detail, switch to a higher magnification objective lens and use the fine focus adjustment to sharpen the focus.

Equipment

- light microscope with low and high power objective lenses
- a range of prepared animal cells including:
  - cheek cells
  - red blood cells
- a range of prepared plant cells including:
  - onion epidermal cells
  - leaf palisade cells

Safety

- Take care when handling glass slides as they are very fragile.
- Take care not to break the slide by moving the stage too close to the objective lens.

Remember

The skill being tested in this practical is whether you can use a light microscope to observe plant and animal cells. You need to be able to describe how to set up the microscope, focus on a slide containing the specimen, and then make a labelled scientific drawing of what you see. Don’t forget to include the magnification in scientific drawings.

To calculate the total magnification of the microscope you used to see your cells:

\[
\text{total magnification} = \text{eyepiece lens magnification} \times \text{objective lens magnification}
\]
Exam Tip

In the exam, you may be asked about a specimen you haven’t come across before. It’s important to remember that it’s still just a plant or animal cell. Apply your knowledge of the microscopy practical to the exam question, whatever the specimen.

1 Label the diagram of an animal cell. [5 marks]

2 Complete the diagram of a plant cell by giving the functions of the labelled organelles. [5 marks]

- cell membrane
- mitochondria
- chloroplasts
- cytoplasm
- ribosomes

3 A student examines an onion cell under a microscope. Suggest why this plant cell is not green. [1 mark]

_________________________________________________________

_________________________________________________________
4 Draw one line from each part of the microscope to its function. [4 marks]

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slide</td>
<td>Part that can move around, so you can view different sections of the sample</td>
</tr>
<tr>
<td>Eyepiece</td>
<td>Smooth curved piece of glass closest to the sample being viewed</td>
</tr>
<tr>
<td>Objective lens</td>
<td>Piece of glass where the sample is immobilised and stained</td>
</tr>
<tr>
<td>Stage</td>
<td>Part of the microscope that you look through</td>
</tr>
</tbody>
</table>

5 Suggest why it is not possible to see the internal structures of a bacterial cell using a light microscope. [1 mark]


6 Which objective lens should you use when you first focus a microscope on a slide? [1 mark]

**Exam Tip**
For this question you need to select ONE answer.
You will not get any marks if you tick more than one box, even if one of the boxes you tick is correct.

Tick one box

- ×4
- ×40
- ×100
- ×400

7 Suggest why it is important to state the magnification on any drawings you make from a microscope. [1 mark]


8 A student drew three images of a plant cell at three different magnifications but failed to label the drawing with the magnification. The microscope has three objective lenses ×40, ×100, and ×400.

![Images A, B, C](image)

Draw **one** line from each image letter to the correct objective lens. [3 marks]

- Image A
- Image B
- Image C

9 A student has prepared a sample on a slide and wants to view it using the ×100 objective lens.

Describe the steps the student should take to focus the microscope. [4 marks]

10 The two different classes of microscopes are light microscopes and electron microscopes.

Compare these two different classes of microscopes. [6 marks]

**Hint**

When compare is the command word in a question, you need to give similarities and differences.