**Using a light microscope**

eyepiece



turret

stage clip

mirror

stage

objective lens

focus knob

**1** The boxes contain instructions for using a light microscope to look at a slide.

What is the correct order?

|  |  |  |
| --- | --- | --- |
| **A**  Look through the eyepiece. |  | **B**  Place the slide on the stage and fasten it with the stage clips. |
|  |  |  |
| **C**  Turn the turret until the medium power objective lens clicks into position, then re-focus the image. |  | **D**  Turn the focus knob until the image is sharp and clear. |
|  |  |  |
| **E**  Look from the side and turn the focus knob to move the objective lens closer to the stage. Stop before the objective lens touches the slide. |  | **F**  Turn the turret until the lowest power objective lens clicks into position. |

**Using a light microscope**



eyepiece

focus knob

turret

objective lens

stage clip

stage

mirror

**2** Which part would you adjust to make the image **brighter**?

|  |  |
| --- | --- |
| **A** | eyepiece |
| **B** | focus knob |
| **C** | mirror |
| **D** | objective lens |

**3** Which part would you adjust to make the image **clearer**?

|  |  |
| --- | --- |
| **A** | eyepiece |
| **B** | focus knob |
| **C** | mirror |
| **D** | objective lens |

*Biology > Big idea BCL: The cellular basis of life > Topic BCL1: Cells > Key concept BCL1.2: Cells and cell structures*

|  |
| --- |
| **Diagnostic question** |
| **Using a light microscope** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Organisms are made up of one or more cells, which have common structures that carry out life processes. |
| Observable learning outcome: | Use a light microscope to make and record observations of cells from a range of tissues and organisms. |
| Question type: | Ordering/Sequencing, simple multiple choice |
| Key words: | cell, microscope |

**What does the research say?**

Researchers have acknowledged that the cell is, when first introduced, an abstract concept (Dreyfus and Jungwirth, 1988; 1989). When introducing ideas about cells, several sources advocate starting with hands-on light microscopy of cells from a range of tissues and organisms, to enable students to discover for themselves that cells are the common building blocks of living things and what they look like (AAAS Project 2061, 2009; Skinner, 2011).

Haşiloğlu and Eminoğlu (2017) found that light microscopy was effective in helping students to overcome misunderstandings about what cells look like; students’ drawings of cells were much more accurate after light microscopy.

The ability to use a light microscope to observe and produce a scientific drawing of a specimen is an assessed practical activity at ages 16 and 18 in England (Department for Education, 2014; 2015).

**Ways to use this question**

Students should complete the questions individually. This could be a pencil and paper exercise, or you could use the PowerPoint presentation with an electronic voting system or mini white boards. The ordering activity in question 1 could be done as a card sort. The sequences that are generated by students could be tested by other groups in the class or by another class.

The answers to the questions will show you whether students understand the standard procedure for setting up a light microscope to observe a specimen on a slide.

*Differentiation*

You may choose to read the questions to the class, so that everyone can focus on the science. In some situations it may be more appropriate for a teaching assistant to read for one or two students.

**Expected answers**

1. **F B E A D C** or **B F E A D C**
2. **C**
3. **B**

**How to respond - what next?**

If there is a range of answers, you may choose to respond through structured class discussion. Ask one student to explain why they gave the answer they did; ask another student to explain why they agree with them; ask another to explain why they disagree, and so on. This sort of discussion gives students the opportunity to explore their thinking and for you to really understand their learning needs. Responses often work best when the activities involve paired or small group discussions, which encourage social construction of new ideas through dialogue.

If students have misunderstandings about the standard procedure for setting up a light microscope to observe a specimen on a slide, the following BEST ‘response activity’ (in which students use checklists of tasks involved in setting up a light microscope) could be used in follow-up to this diagnostic question:

* Response activity: What is it made of?

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Images: UYSEG

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