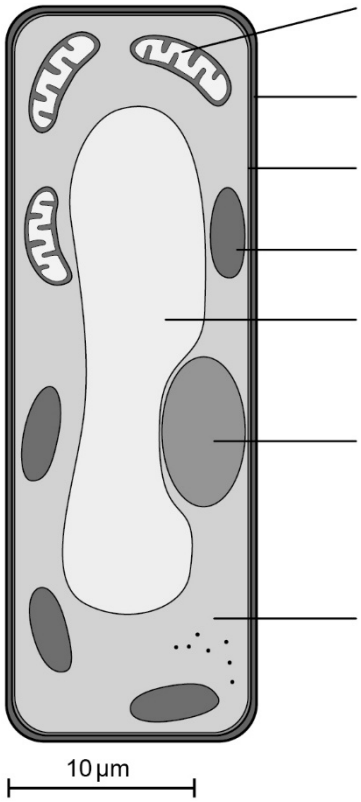
1 **a** What is an estimate?_____

b Why do we use estimates?_____

c When can an estimate be used and when can it not?_____

2 The diagram shows a cell that is 40 μm tall and 10 μm wide.



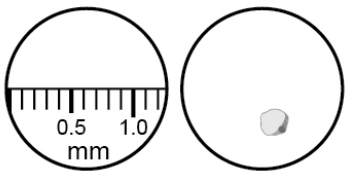
a Make of copy of the drawing at a magnification of ×3000.

b Add a suitable **scale bar** to show the size of the cell.

c The cell is one of the following: oak leaf cell, human liver cell, human eye (retina) cell, onion bulb cell, cat skin cell. Which type of cell is it? Explain your reasoning.

d Label the sub-cellular parts of the cell on your drawing, together with a description of each part's function.

3 The image to the right shows the view through a microscope when looking at a special type of slide with a fine scale on it.



a What is the diameter of the **field of view**?

b This type of slide cannot be used with a specimen on it. How would you use this slide to estimate the size of some human liver cells that are on a pre-prepared slide? Write out a short step-by-step method.

Extra challenge

4 **Ribosomes** were not identified until the 1950s, 300 years after Hooke and van Leeuwenhoek identified living cells. Explain why this was and what developments had taken place in that period to make this possible.