

1 Copy and complete the table to show the missing magnifications.

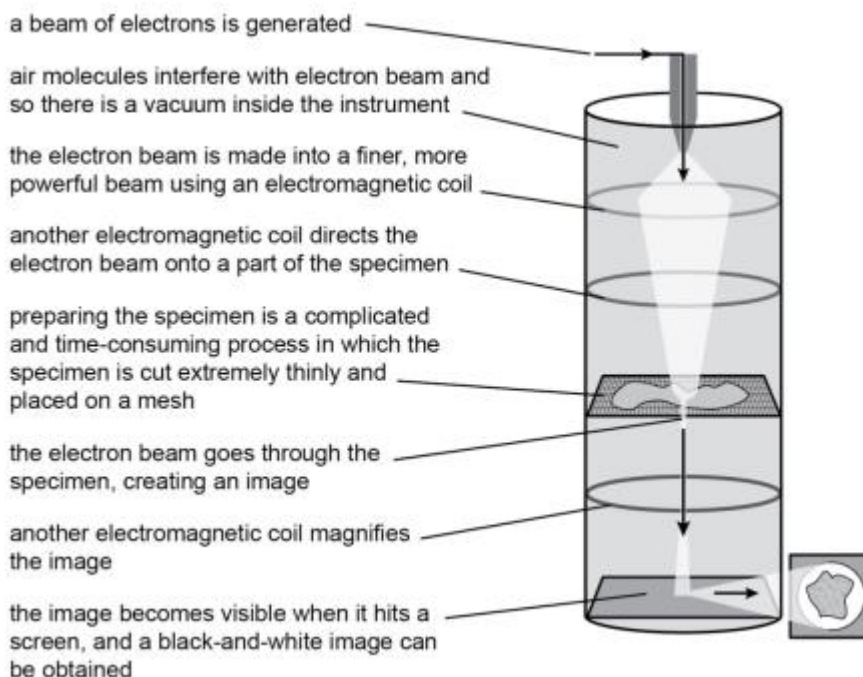
Eyepiece lens magnification	Objective lens magnification	Total magnification
×3	×5	
	×10	×60
×7.5		×225
	×20	×250

- 2 A red blood cell is 8  $\mu\text{m}$  in diameter. How big will its diameter be if magnified  $\times 2000$ ? Show your working and give your answer in millimetres.
- 3 Flu virus particles are about 130 nm in diameter. What magnification will be needed in order to produce an image in which the flu virus is 2.6 cm in diameter? Show your working.
- 4 The **resolution** of microscope X is 0.2  $\mu\text{m}$ . The resolution of microscope Y is 20 000 pm and that of microscope Z is 1 nm.

- a Which microscope will be best at showing the finest details inside a cell? Explain your answer.
- b Which microscope(s) will be able to show some details of hepatitis virus particles, which are 45 nm in diameter?

5 The diagram shows what happens inside an electron microscope.

- a What goes through a specimen in a school microscope to create an image?
- b Which of the three electromagnetic coils is most like the objective lens on a school microscope? Explain your reasoning.
- c Explain why an electron microscope would not be used to watch the heart of a water flea pumping.
- d Explain why an electron microscope would not be used to examine the dots of colour used to produce photographs in a newspaper.
- e Explain why an electron microscope *would* be used to see the details in the cytoplasm of a cell.



### Extra challenge

6 Draw a table to compare electron microscopes with school-type microscopes.