OCR (B) Biology GCSE

Topic B4.2: How do we know about mitochondria and other cell structures?

Flashcards

What is magnification?

What is magnification?

The number of times bigger an image appears compared to the size of the specimen

How can the total magnification of an image be calculated from lens powers?

How can the total magnification of an image be calculated from lens powers?

$$\text{total magnification} = \text{eyepiece lens magnification} \times \text{objective lens magnification}$$

How can the magnification of an image be calculated?

How can the magnification of an image be calculated?

$$\text{magnification} = \frac{\text{size of image}}{\text{size of specimen}}$$

What is resolution?

What is resolution?

The smallest distance between two distinct objects that can be distinguished

How does a light microscope work?

How does a light microscope work?

A light microscope passes a beam of light through a specimen. The light then travels through the eyepiece lens, allowing the specimen to be observed.

What are the advantages of light microscopes? (4)

What are the advantages of light microscopes? (4)

- Inexpensive
- Easy to use
- Portable
- Observe both dead and living specimens

What is the disadvantage of light microscopes?

What is the disadvantage of light microscopes?

Limited resolution

How does an electron microscope work?

How does an electron microscope work?

It uses a beam of electrons focused using magnets. The electrons hit a fluorescent screen which emits visible light, producing an image.

Name the two types of electron microscopes

Name the two types of electron microscopes

Transmission electron microscope (TEM)

Scanning electron microscope (SEM)

What is the advantage of electron microscopes?

What is the advantage of electron microscopes?

Greater magnification and resolution

Why do electron microscopes have a greater magnification and resolution?

Why do electron microscopes have a greater magnification and resolution?

They use a beam of electrons which has a shorter wavelength than photons of light

How have electron microscopes enabled scientists to develop their understanding of cells?

How have electron microscopes enabled scientists to develop their understanding of cells?

- Allow small sub-cellular structures (e.g. mitochondria, ribosomes) to be observed in detail

- Enable scientists to develop more accurate explanations about how cell structure relates to function

What are the disadvantages of electron microscopes? (4)

What are the disadvantages of electron microscopes? (4)

- Expensive
- Large so less portable
- Require training to use
- Only dead specimens can be observed

How do you convert from m to mm?

How do you convert from m to mm?

$\times 1000 (\times 10^3)$

How do you convert from m to μm?

How do you convert from m to μm?

$\times 1\,000\,000 (\times 10^6)$

How do you convert from m to nm?

How do you convert from m to nm?

$\times 1\,000\,000\,000 (\times 10^{9})$

How do you convert from m to pm?

How do you convert from m to pm?

$\times 1\,000\,000\,000\,000\ (\times 10^{12})$