Edexcel Biology GCSE

Topics 1.1 to 1.5 - Cells and microscopy

Flashcards

State the two types of cell

State the two types of cell

Eukaryotic (animals and plants) and prokaryotic

What is the difference between a eukaryotic and prokaryotic cell?

What is the difference between a eukaryotic and a prokaryotic cell?

A eukaryotic cell contains a nucleus and membrane-bound organelles. A prokaryotic cell does not.

List the components of both plant and animal cells (5)

List the components of both plant and animal cells (5)

- Nucleus
- Cytoplasm
- Cell membrane
- Mitochondria
- Ribosomes

How is genetic information stored in a eukaryotic cell?

How is genetic information stored in a eukaryotic cell?

Within the nucleus, arranged in chromosomes

Other than storing genetic information, what is the function of the nucleus?

Other than storing genetic information, what is the function of the nucleus?

Controls cellular activities

Describe the structure of the cytoplasm

Describe the structure of the cytoplasm

- Fluid component of the cell
- Contains organelles, enzymes and dissolved ions and nutrients

What is the function of the cytoplasm?

What is the function of the cytoplasm?

Site of cellular reactions e.g. first stage of respiration

What is the function of the cell membrane?

What is the function of the cell membrane?

Controls the entry and exit of materials into and out of the cell

What is the function of the mitochondria?

What is the function of the mitochondria?

Site of later stages of aerobic respiration in which ATP is produced

What is the function of the ribosomes?

What is the function of the ribosomes?

Joins amino acids in a specific order during translation

Which organelles are found in plant cells only? (3)

Which organelles are found in plant cells only? (3)

- Large, permanent vacuole
- Cell wall
- Chloroplasts

What is the cell wall made of?

What is the cell wall made of?

Cellulose

What is the function of the cell wall?

What is the function of the cell wall?

- Provides strength
- Prevents the cell bursting when water enters by osmosis

What does the permanent vacuole contain?

What does the permanent vacuole contain?

A solution of salts, sugars and organic acids

What is the function of the permanent vacuole?

What is the function of the permanent vacuole?

Supports the cell, maintaining its turgidity

What is the function of the chloroplasts?

What is the function of the chloroplasts?

Site of photosynthesis

When looking at a cell using a light microscope, why do chloroplasts appear green?

When looking at a cell using a light microscope, why do chloroplasts appear green?

Contain chlorophyll, a green pigment

List the organelles found in prokaryotic cells (6)

List the organelles found in prokaryotic cells (6)

- Chromosomal DNA
- Plasmid DNA
- Cell wall
- Cell membrane
- Ribosomes
- Flagella

How is genetic information stored in a prokaryotic cell?

How is genetic information stored in a prokaryotic cell?

Found free within the cytoplasm as:

- Chromosomal DNA (single large loop of circular DNA)
- Plasmid DNA

What are plasmids?

What are plasmids?

- Small, circular loops of DNA found free in the cytoplasm and separate from the main DNA
- Carry genes that provide genetic advantages e.g. antibiotic resistance

What is the prokaryotic cell wall composed of?

What is the prokaryotic cell wall composed of?

Peptidoglycan

What is a flagellum?

What is a flagellum?

- Long, rotating, ‘whip-like’ protrusion
- Enables bacteria to move

What is a haploid cell?

What is a haploid cell?

A cell that contains a single copy of each chromosome (half the number of chromosomes)

e.g. 23 chromosomes in humans

What is a diploid cell?

What is a diploid cell?

A cell that contains two copies of each chromosome (full set of chromosomes)

e.g. 46 chromosomes in humans

What are gametes?

What are gametes?

- Reproductive cells (e.g. egg and sperm cells)
- They are haploid cells

Describe sexual reproduction in terms of chromosome number

Describe sexual reproduction in terms of chromosome number

- Two haploid gametes fuse
- Resulting embryo has two chromosomes for each gene and two copies of each allele ∴ diploid

Describe how egg cells are adapted to their function

Describe how egg cells are adapted to their function

- **Haploid nucleus** contains genetic material
- **Mitochondria** in cytoplasm produce energy for the developing embryo
- Cytoplasm contains **nutrients** for the developing embryo
- **Cell membrane hardens** after fertilisation, preventing the entry of other sperm and ensuring the zygote is diploid

Describe how sperm cells are adapted to their function

Describe how sperm cells are adapted to their function

- **Haploid nucleus** contains genetic information
- **Tail** enables movement
- **Mitochondria** provide energy for tail movement
- **Acrosome** contains enzymes that digest the egg cell membrane

Where are ciliated epithelial cells found?

Where are ciliated epithelial cells found?

Found lining the surface of structures such as the respiratory tract and uterus.

Describe the function of ciliated epithelial cells lining the airways

Describe the function of ciliated epithelial cells lining the airways

Move in synchronised waves to beat mucus (containing dirt and pathogens) up to the back of the throat where it can be swallowed.

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 objects that can be distinguished

How does a light microscope work?

How does a light microscope work?

Passes a beam of light through a specimen which 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 which are focused using magnets. The electrons hit a fluorescent screen which emits visible light, producing an image.

Name the two types of electron microscope

Name the two types of electron microscope

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?

× 1 000 000 (× 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 to you convert from nm to m?

How to you convert from nm to m?

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

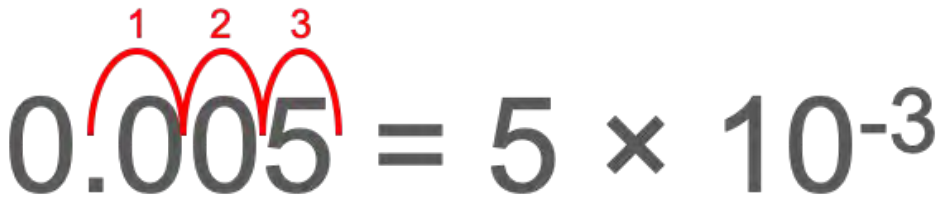
How do you convert from m to pm?

How do you convert from m to pm?

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

Write 0.005 in standard form (higher)

Write 0.005 in standard form (higher)



Write 10382 in standard form (higher)

Write 10382 in standard form (higher)

Convert 1.527 m to μm. Write your answer in standard form (higher)

Convert 1.527 m to μm. Write your answer in standard form (higher)

$1.527\ \text{m} \times 1000000 = 1527000\ \mu\text{m}$

$1527000\ \mu\text{m} = \mathbf{1.527 \times 10^6\ \mu m}$