

Cell structure and specialised cells

What is a eukaryotic cell?

Cell structure and specialised cells

What is a prokaryotic cell?

Cell structure and specialised cells

Function of the nucleus

Cell structure and specialised cells

Function of the cell membrane

Cell structure and specialised cells

Function of mitochondria

Cell structure and specialised cells

Function of ribosomes

Cell structure and specialised cells

Which structures do plant cells have that animal cells do not?

Cell structure and specialised cells

Function of chloroplasts

A cell with no nucleus. The genetic material is free in the cytoplasm. Bacteria are prokaryotic.

A cell whose genetic material is enclosed in a nucleus. Animal and plant cells are eukaryotic.

Controls the movement of substances into and out of the cell.

Contains the genetic material (DNA) and controls the activities of the cell.

Where proteins are made (protein synthesis).

Where aerobic respiration takes place, releasing energy for the cell.

Contain chlorophyll, which absorbs light energy for photosynthesis.

Cell wall, chloroplasts and a vacuole.

Cell structure and specialised cells

Function of the plant cell wall and the vacuole

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Name the structures in a bacterial cell (spec list)

Cell structure and specialised cells

What is a plasmid?

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Function of a flagellum

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Sperm cell: acrosome and haploid nucleus

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Sperm cell: mitochondria and tail

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Name three adaptations of an egg cell

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Why does the egg cell membrane change after fertilisation?

Chromosomal DNA, plasmid DNA, cell membrane, ribosomes and flagella.

The cell wall (cellulose) strengthens and supports the cell. The vacuole contains cell sap and keeps the cell firm.

A whip-like structure that moves to make the bacterium swim.

A small ring of extra DNA in a bacterial cell, separate from the chromosomal DNA.

Mitochondria release energy by respiration for the tail. The tail moves to propel the sperm towards the egg.

The acrosome holds enzymes that digest the egg's outer layers. The haploid nucleus has half the chromosomes, so fertilisation restores the full number.

So that no more sperm can enter the egg.

Nutrients in the cytoplasm, a haploid nucleus, and changes in the cell membrane after fertilisation.

Cell structure and specialised cells

How are ciliated epithelial cells adapted?

Microscopy and measuring cells

What is resolution?

Microscopy and measuring cells

Why do electron microscopes show more detail than light microscopes?

Microscopy and measuring cells

How have electron microscopes improved our understanding of cells?

Microscopy and measuring cells

When should an estimation be used?

Microscopy and measuring cells

What are milli, micro, nano and pico as powers of ten?

Microscopy and measuring cells

How do you convert mm to μm , and μm to nm?

Microscopy and measuring cells **Higher tier**

Write 0.000 045 m in standard form

How well a microscope can show two points that are close together as separate points.

They have cilia that beat to move mucus, with trapped dust and microorganisms, away from the lungs.

They show sub-cellular structures in detail, so we understand what each structure does.

They have a higher magnification and higher resolution.

milli 10^{-3} , micro 10^{-6} , nano 10^{-9} , pico 10^{-12} .

To check an answer is sensible, or when an exact value is not needed or cannot be found.

4.5×10^{-5} m.

Multiply by 1000 each time.

Microscopy and measuring cells

Magnification equation

Microscopy and measuring cells

**Rearrange the magnification equation
to find real size**

Microscopy and measuring cells

**Why is the coverslip lowered at an
angle?**

Microscopy and measuring cells

Rules for a scientific drawing

Enzyme action and activity

What is an enzyme?

Enzyme action and activity

What is the active site?

Enzyme action and activity

Why are enzymes specific?

Enzyme action and activity

What does denatured mean?

real size = image size $\div$ magnification.

magnification = size of image $\div$ size of real object.

Sharp pencil, clear continuous lines, no shading, drawn large, ruled label lines, title and magnification.

To avoid trapping air bubbles over the specimen.

The region of an enzyme where the substrate binds, with a shape complementary to the substrate.

A protein that acts as a biological catalyst, speeding up a reaction without being used up.

The enzyme's shape, including the active site, has permanently changed, so the substrate no longer fits.

Only a substrate with a shape complementary to the active site can fit, so each enzyme catalyses one type of reaction.

Enzyme action and activity

Effect of increasing temperature up to the optimum

Enzyme action and activity

Why does the rate fall above the optimum temperature?

Enzyme action and activity

Why does the rate level off as substrate concentration rises?

Enzyme action and activity

What happens to enzyme activity as pH moves away from the optimum?

Enzyme action and activity

pH core practical: how do you know the starch has gone?

Enzyme action and activity

pH core practical: variables to control

Enzyme action and activity

Rate of reaction equation

Biological catalysts, food tests and energy in food

What are carbohydrates, proteins and lipids broken down into?

The enzyme is denatured as the active site changes shape.

The rate increases, because particles have more kinetic energy and collide more often.

The rate decreases, and at extreme pH the enzyme is denatured.

All the active sites are occupied, so adding more substrate makes no difference.

Temperature, volume and concentration of enzyme, and volume and concentration of starch.

The iodine solution stays orange-brown instead of turning blue-black.

Sugars, amino acids, and fatty acids and glycerol.

rate = amount of product formed $\div$ time taken. For example cm³/s.

Biological catalysts, food tests and energy in food

What do enzymes build from amino acids?

Biological catalysts, food tests and energy in food

Triple only

Test for starch and positive result

Biological catalysts, food tests and energy in food

Triple only

Test for reducing sugars and positive result

Biological catalysts, food tests and energy in food

Triple only

Test for protein and positive result

Biological catalysts, food tests and energy in food

Triple only

Test for fats and positive result

Biological catalysts, food tests and energy in food

Triple only

How is the energy in food measured using calorimetry?

Biological catalysts, food tests and energy in food

Triple only

Energy released equation (calorimetry)

Transport in cells

Define diffusion

Iodine solution. Orange-brown turns blue-black.

Proteins. Enzymes also build carbohydrates from sugars and lipids from fatty acids and glycerol.

Biuret reagent. Blue turns purple (lilac).

Benedict's solution, heated in a hot water bath. Blue turns green, yellow, orange or brick-red.

Burn the food to heat a known mass of water. Use the temperature rise to calculate the energy released.

Shake with ethanol, then add water. A cloudy white emulsion forms.

The net movement of particles from a region of higher concentration to a region of lower concentration.

energy (J) = mass of water (g) $\times$ 4.2 $\times$ temperature change ($^{\circ}\text{C}$).

Transport in cells

Define osmosis

Transport in cells

Define active transport

Transport in cells

Factors that increase the rate of diffusion

Transport in cells

Which of diffusion, osmosis and active transport need energy from respiration?

Transport in cells

Potato core practical: what is measured?

Transport in cells

Potato core practical: why blot the cylinders dry?

Transport in cells

What does a potato gaining mass show?

Transport in cells

Percentage change in mass equation

Movement of substances against a concentration gradient, from dilute to concentrated, using energy from respiration.

The diffusion of water from a dilute solution to a more concentrated solution through a partially permeable membrane.

Only active transport.

A steeper concentration gradient, a higher temperature and a larger surface area.

Water on the surface would add extra mass that is not from osmosis.

The mass of potato cylinders before and after time in solutions of different concentrations.

$$\frac{(\text{final mass} - \text{initial mass})}{\text{initial mass}} \times 100.$$

The solution is more dilute than the cell contents, so water entered by osmosis.