

Key concepts in biology

Cells

Animal cell

Nucleus Cell membrane Mitochondria Ribosomes

Plant cell

Cell wall Chloroplasts Vacuole

Bacterial cell

Chromosomal DNA Plasmid DNA
Ribosomes and membrane Flagella

Sperm cell

Acrosome Haploid nucleus Mitochondria Tail

Egg cell

Nutrients Haploid nucleus Membrane changes

Ciliated epithelial cell

Cilia move mucus

Microscopy and units

Light microscope

Light and glass lenses Lower magnification
Lower resolution

Electron microscope

Higher magnification Higher resolution
More sub-cellular detail

Estimation

Check answers Exact value not needed

Units

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

Standard form **Higher tier**

Number $\times$ power of ten Calculate with it

Magnification

Image $\div$ real size Labelled drawings

Enzymes

Biological catalysts

Proteins Not used up

Active site

Complementary shape Specific

Denaturing

Active site changes shape

Temperature

Optimum Denatured when high

Substrate concentration

Rate then plateau

pH

Optimum pH Extreme pH denatures

Core practical: pH

Amylase and starch Iodine

Rate calculations

Product $\div$ time

Enzymes in the body and food

Breakdown

Sugars Amino acids Fatty acids and glycerol

Synthesis

Carbohydrates Proteins Lipids

Food tests **Triple only**

Iodine: starch Benedict's: sugars Biuret: protein
Ethanol: fats

Calorimetry **Triple only**

Burn food Heat water Energy per gram

Transport in cells

Diffusion

High to low No energy

Osmosis

Water only Partially permeable membrane

Active transport

Against gradient Energy from respiration

Factors for diffusion

Gradient Temperature Surface area

Core practical: potatoes

Cylinders in solutions Mass change

Percentage change

$(\text{final} - \text{initial}) \div \text{initial} \times 100$