

Cell biology

Cell structure

Eukaryotes and prokaryotes

- Nucleus or not
- Single DNA loop
- Plasmids
- Much smaller bacteria

Sub-cellular structures

- Nucleus
- Mitochondria
- Chloroplasts
- Cell wall

Specialised cells

- Sperm, nerve, muscle
- Root hair, xylem, phloem
- Differentiation

Microscopy

- Light microscope
- Electron microscope
- Magnification equation
- Standard form

Required practical 1

- Slide and cover slip
- Low power first
- Drawing and scale

Culturing microorganisms **Triple only**

- Binary fission
- Aseptic technique
- Zones of inhibition
- Area = πr^2

Cell division

Chromosomes

- Made of DNA
- Many genes
- Pairs

Cell cycle

- Growth and DNA copying
- Mitosis
- Cytoplasm divides

Mitosis

- Two identical cells
- Growth and development
- Repair and replacement

Stem cells

- Embryos
- Adult bone marrow
- Meristems in plants

Stem cell treatment

- Diabetes, paralysis
- Therapeutic cloning
- Viral infection risk
- Ethical objections

Plant cloning

- Rare species
- Disease-resistant crops

Transport in cells

Diffusion

- High to low concentration
- Oxygen, carbon dioxide, urea

Rate of diffusion

- Concentration gradient
- Temperature
- Surface area

Surface area to volume ratio

- Large in single cells
- Small in large organisms

Exchange surfaces

- Large surface area
- Thin membrane
- Blood supply
- Ventilation

Osmosis

- Water only
- Partially permeable membrane
- Practical: mass of plant tissue

Active transport

- Against the gradient
- Energy from respiration
- Root hairs, gut