

# Organisation of an Organism

## Cell Structure and Organisation

All organisms are made of cells, the basic building blocks of life. Students must know how to draw and label basic plant and animal cells and explain the functions of their structures.

- Both cells have a **cell membrane** (controls entry/exit of substances), **nucleus** (stores genetic info), **cytoplasm** (jelly-like substance for chemical reactions), and **mitochondria** (site of respiration).
- Plant cells additionally have a **cell wall** (provides support), **chloroplasts** (site of photosynthesis), and a **permanent vacuole** (supports the cell via turgor pressure). Animal cells have small, temporary vacuoles.
- **Extended syllabus** requires understanding the **rough endoplasmic reticulum (RER)** (tubular membranes with ribosomes for protein synthesis) and **ribosomes** (site of protein synthesis, also found free in the cytoplasm).

## Structure & Function

- **Cell membrane:** Controls substance entry/exit
- **Nucleus:** Contains DNA
- **Cytoplasm:** Site for chemical reactions
- **Vacuole:** Stores materials, maintains water balance, supports plant cells
- **RER:** Studded with ribosomes for protein synthesis
- **Ribosomes:** Protein synthesis site
- **Mitochondria:** Respiration site, provides energy
- **Cell wall (plants):** Provides structural support
- **Chloroplast (plants):** Site of photosynthesis

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## Levels of Organisation

- **Cell:** Smallest functional unit
- **Tissue:** Group of similar cells performing a shared function
- **Organ:** Group of tissues working together
- **Organ system:** Group of organs performing related functions

Specialized cells include **ciliated cells**, **root hair cells**, **xylem vessels**, **palisade cells**,

nerve cells, red blood cells, sperm and egg cells.

## Size of Specimens

Biology often requires microscopes to examine cells. Students must know how to use the equation for magnification:

$$\text{Magnification} = \text{Image size} \div \text{Actual size}$$

Exams typically provide two values and ask for the third.



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