

CHAPTER 2

ORGANISATION OF THE ORGANISM

The stuff you need to know in this chapter:

2.1 CELL STRUCTURE AND ORGANISATION

Core:

- Describe and compare the structure of a plant cell with an animal cell, as seen under a light microscope, limited to cell wall, nucleus, cytoplasm, chloroplasts, vacuoles and location of the cell membrane
- State the functions of the structures seen under the light microscope in the plant cell and in the animal cell

Extended:

- State that the cytoplasm of all cells contains structures, limited to ribosomes on rough endoplasmic reticulum and vesicles
- State that almost all cells, except prokaryotes, have mitochondria and rough endoplasmic reticulum
- Identify mitochondria and rough endoplasmic reticulum in diagrams and images of cells
- State that aerobic respiration occurs in mitochondria
- State that cells with high rates of metabolism require large numbers of mitochondria to provide sufficient energy

2.2 LEVELS OF ORGANISATION

Core:

- Relate the structure of the following to their functions - ciliated cells, root hair cells, xylem vessels, palisade mesophyll cells, nerve cells, red blood cells, sperm and egg cells
- Define tissue as a group of cells with similar structures, working together to perform a shared function
- Define organ as a structure made up of a group of tissues, working together to perform body functions
- State examples of tissues, organs and organ systems from sections 6 to 16
- Identify the different levels of organisation in drawings, diagrams and images of familiar material

Extended:

- Identify the different levels of organisation in drawings and images of unfamiliar material



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2.3 SIZE OF SPECIMENS

Core:

- Calculate magnification and size of biological specimens using millimetres as units

Extended:

- Calculate magnification and size of biological specimens using millimetres and micrometres as units



2.1 CELL STRUCTURE AND ORGANISATION

1. Complete the table describing the function of each of the following cell parts

Organelle	Function	Animal/plant/both?
Ribosomes		
Nucleus		
Mitochondria		

2. All cells contain ribosomes and genetic material, and most cells contain mitochondria and a nucleus. State the type of cell which does **NOT** contain mitochondria or a nucleus

3. Liver cells have a high rate of metabolism. What can you deduce about the number of mitochondria in liver cells?



2.2 LEVELS OF ORGANISATION

1. List the levels of organisation of living material and write their definition. Give an example of each

	Level of organisation	Definition	Example
Smallest			
Largest			

2. For each cell type described, write its name, draw the picture, and explain how it is adapted to its function.

Name and picture	Adaptation(s)



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2. (Cont.)

Name and picture	Adaptation(s)



2.3 SIZE OF SPECIMENS

1. State the calculation for each of the following:

Magnification =

Actual size of object =

Size of Image =

2. Draw the formula triangle for magnification calculations

3. Draw a picture of an onion cell as seen through a light microscope



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4. Assume that an onion cell is 300 micrometres in length, calculate the magnification of your cell drawing in question 3. Show all of your working.

5. Complete the table to convert the units

Metres (m)	Millimetres (mm)	Micrometres (μm)	Nanometres (nm)
	10		
		5	
			3500

(Note: Nanometres are common used in biology so they're useful to know, but you don't need to use them for IGCSE biology).

