

Cambridge IGCSE Biology

CHAPTER 02

ORGANISATION OF THE ORGANISM

WHOLE UNIT WORKBOOK

Cambridge IGCSE Biology 0610

ScienceSauceOnline.com



Youtube: [youtube.com/sciencesauceonline](https://www.youtube.com/sciencesauceonline)

02. 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

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

(Cambridge International Examinations, 2014)



IGCSE Biology (0610) Workbook

Core and Extended candidate tasks:

All content marked with an **E** symbol is for extended candidates only.

Core level students should complete all tasks except for those with the **E** symbol.

Extended level candidates should complete all questions, including those with the **E** symbol.



IGCSE Biology (0610) Workbook

2.1 CELL STRUCTURE AND ORGANISATION

1. Complete the table describing the function of each of the following cell parts. State whether each organelle is found in animal cells, plant cells, or both.

Organelle	Function	Animal/plant/both?
Nucleus	<hr/> <hr/> <hr/>	
Ribosomes	<hr/> <hr/> <hr/>	
Chloroplasts	<hr/> <hr/> <hr/>	
Cell Wall	<hr/> <hr/> <hr/>	
Vacuoles	<hr/> <hr/> <hr/>	
Mitochondria	<hr/> <hr/> <hr/>	

2. Below is a list of structures found inside of most cells. Prokaryotes are different, they only have some of these structures. Complete the table to state which structures are found in prokaryotes.

Structure	Found in Prokaryotes? (✓)
Ribosomes	<input type="checkbox"/>
Mitochondria	<input type="checkbox"/>
Nucleus	<input type="checkbox"/>
Rough endoplasmic reticulum	<input type="checkbox"/>
Vesicles	<input type="checkbox"/>
Cell membrane	<input type="checkbox"/>

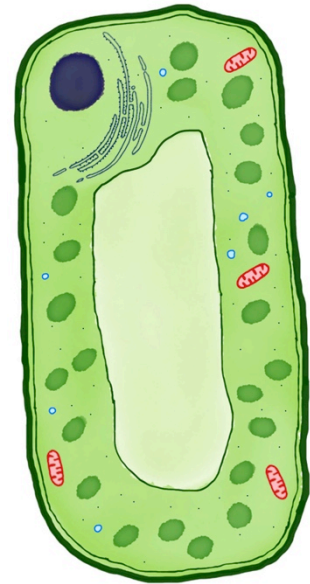
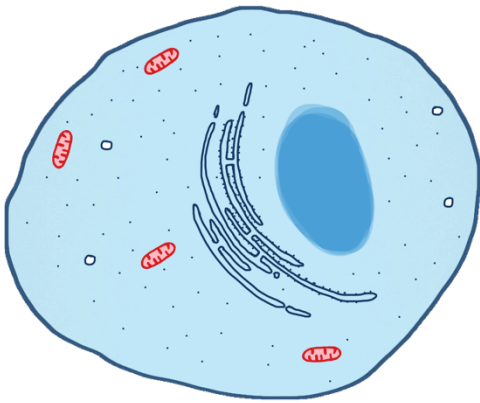


IGCSE Biology (0610) Workbook

3. Look at the sketch of an animal and plant cells below. Label it with them following labels:

nucleus, cell membrane, cytoplasm, chloroplasts, cell wall

ribosomes, rough endoplasmic reticulum, mitochondria, vesicles



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



© A. Nixon 2019

For videos, worksheets and other resources go to ScienceSauceOnline.com

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		_____ _____ _____	
		_____ _____ _____	
		_____ _____ _____	
		_____ _____ _____	



IGCSE Biology (0610) Workbook

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

Name and picture	Adaptation(s)
Nerve cell	<hr/> <hr/> <hr/> <hr/> <hr/>
Palisade cell	<hr/> <hr/> <hr/> <hr/> <hr/>
Red blood cell	<hr/> <hr/> <hr/> <hr/> <hr/>
Sperm cell	<hr/> <hr/> <hr/> <hr/> <hr/>
Ovum (egg cell)	<hr/> <hr/> <hr/> <hr/> <hr/>
Ciliated cell	<hr/> <hr/> <hr/> <hr/> <hr/>



IGCSE Biology (0610) Workbook

... 2. (Cont.)

Name and picture	Adaptation(s)
Root hair cell	<hr/> <hr/> <hr/> <hr/>
Xylem	<hr/> <hr/> <hr/> <hr/>

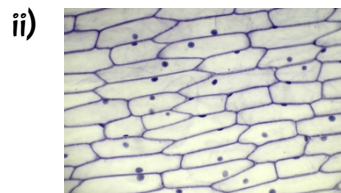
3.

a) Look at the following images and drawings. In each case decide what level of organisation is shown/highlighted. Choose from only the following for your answers:

a cell, a tissue, an organ, an organ system, an organism

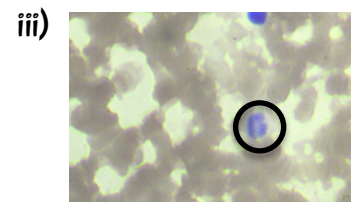


The area circled is

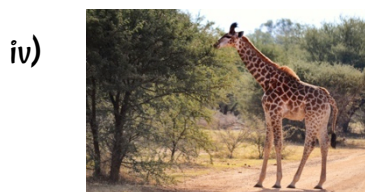


The area in this image

is _____

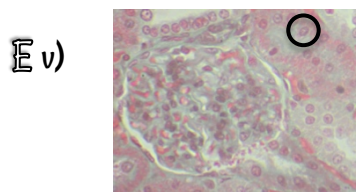


The area circled is

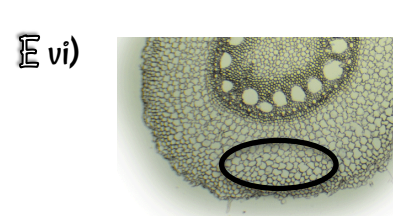


The giraffe in this image

is _____



The area circled is



The area circled is

IGCSE Biology (0610) Workbook

b) If your answers to part a) are correct, you have not used on of the levels of organisation. State which one this is and list three examples of these found in the human body

Level of organisation:



2.3 SIZE OF SPECIMENS

1. State the calculation for each of the following:

Magnification =

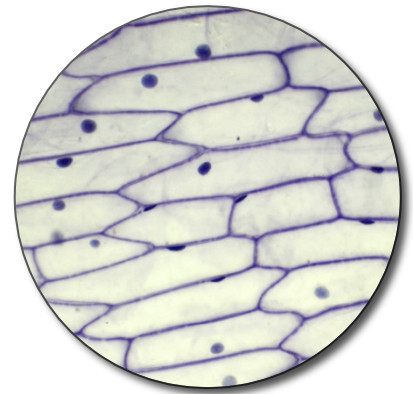
Actual size of object =

Size of Image =

2. Draw the formula triangle for magnification calculations.

3.

a) Using the onion cell micrograph, draw an enlarged, labeled picture of the onion tissue.



IGCSE Biology (0610) Workbook

b)

i) Measure the length of one of the cells in your drawing. Draw a line on the cell in your drawing.

Length of cell = _____ (remember the units!)

ii) Assume that an onion cell is 0.3 millimetres in length, calculate the magnification of your drawing. Show all of your working.

Magnification = _____

4. Complete the table to convert the units

(Core candidates only need to be able to work with metres and millimetres)

Metres (m)	Millimetres (mm)	☒ Micrometres (μm)	<i>Bonus practice:</i> Nanometres (nm)
	10		
	0.005		
	0.0035		

(Note: Nanometres are commonly used in biology for really small things like organelles and viruses so they're useful to know, but you don't need to use them for IGCSE biology).



IGCSE Biology (0610) Workbook

5. A student draws a picture of a cell. The true width of the cell is $20\mu\text{m}$ (micrometres). If the student's drawing is $2500\times$ larger than the real cell, what is the width of the cell the student has drawn? Show your working.



IGCSE Biology (0610) Workbook

Credits and References

- Created by A. Nixon. sciencesauceonline.com
- All content, including images and sketches, by A. Nixon unless otherwise stated.
- Images: "Ratwood leaves", "Onion Tissue", "Giraffe", "Blood thin film", "Root TS", "Kidney TS", "Animal cell", "Plant cell". By A. Nixon.
- Learning objectives are taken from the Cambridge International Examinations IGCSE Biology syllabus guide: Cambridge International Examinations (2014) *0610 IGCSE Biology Syllabus Guide* [Online] Available at: <http://www.cie.org.uk/images/167733-2016-2018-syllabus.pdf>

Font Credits:

- LuckiestGuy.ttf: Copyright (c) 2010 by Brian J. Bonislawsky DBA Astigmatic (AOETD). All rights reserved. Available under the Apache 2.0 licence. <http://www.apache.org/licenses/LICENSE-2.0.html>
- Rancho-Regular.ttf: Copyright (c) 2011 by Font Diner, Inc. All rights reserved.
- IndieFlower.ttf: Copyright (c) 2010, Kimberly Geswein (kimberlygeswein.com kimberlygeswein@gmail.com)

Copyright Notice

Copyright 2017 Alexander Nixon. All rights reserved.

Permission granted for photocopying within **one** institution only, for educational use.

