

SUMMER PREPARATORY WORK

AS LEVEL BIOLOGY

Central
Saint Michael's
Sixth Form

A UNIVERSITY-STYLE SIXTH FORM

Welcome to Biology

We are delighted that you have chosen to study AS Biology at Central Saint Michael's Sixth Form. This is your 'Bridging the Gap' task for AS Biology. This pack will allow you to develop an understanding of the topics that are studied in Biology and help you to develop your research, analysis and evaluation skills; key skills for any scientist. We hope you enjoy the tasks and look forward to seeing you in September so that we can begin the journey into mammalian physiology, biochemistry of life, genetics and much more.



Course outline

Module 1: Development of practical skills

Module 2: Foundations in biology

- Basic components of living systems

- Biological molecules

- Enzymes

- Plasma membranes

- Cell division

Module 3: Exchange and transport

- Exchange surfaces and breathing

- Transport in animals

- Transport in plants

Module 4: Biodiversity, evolution and disease

- Classification and evolution

- Biodiversity

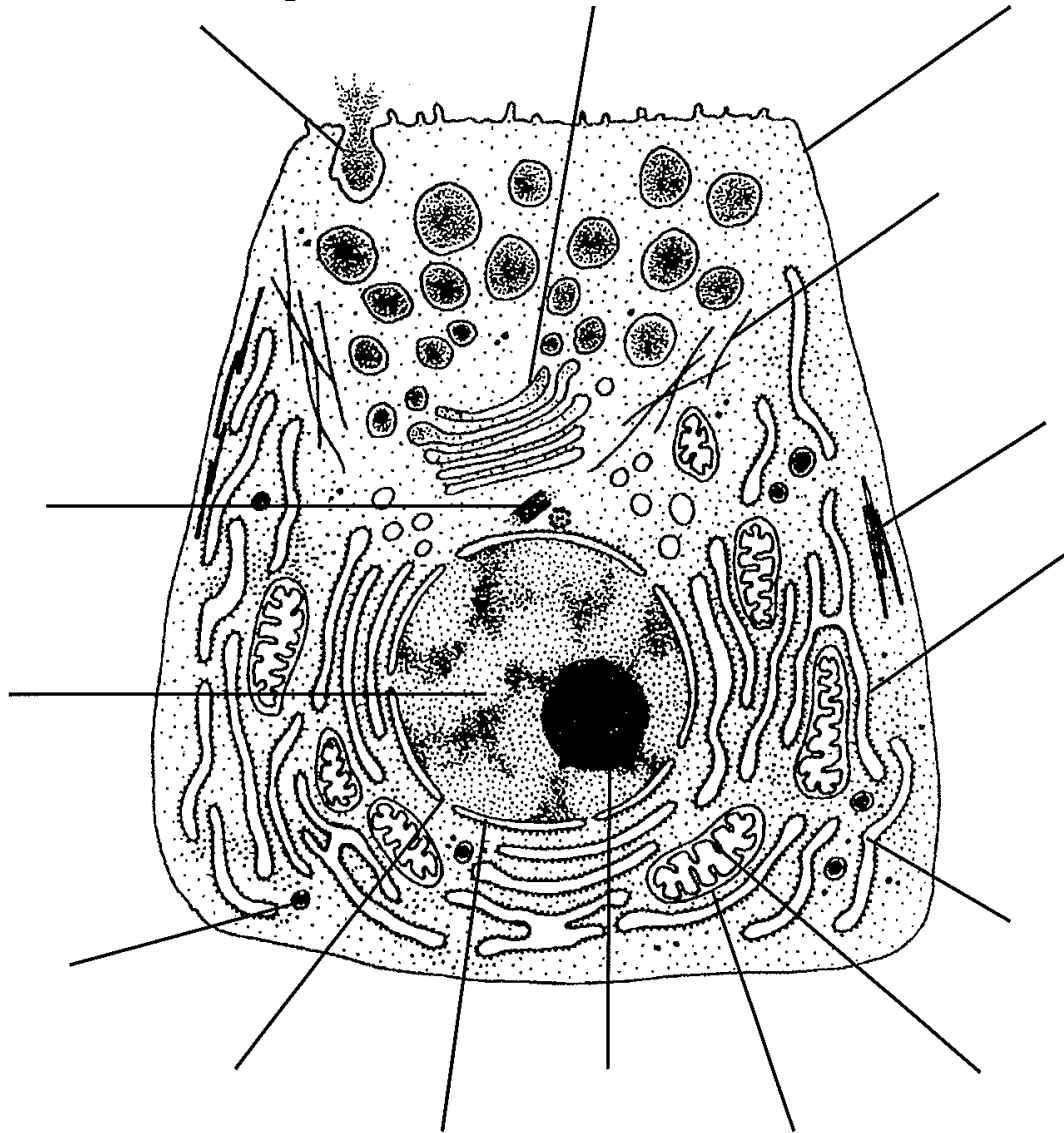
- Communicable diseases

Biology is the most powerful technology ever created. DNA is software, proteins are hardware, cells are factories.

Arvind Gupta

Task Three: Cell ultrastructure

This is an animal cell. Carry out some research into animal cells and use your knowledge to label the structures on the diagram.



Mitochondrion	Nucleolus	Cell membrane
Nucleus	Ribosome	Microtubule
Microfilament	Centriole	Lysosome
Rough endoplasmic reticulum	Nuclear membrane	Cristae
Exocytotic vesicle	Golgi apparatus	Nuclear pore

Write a sentence to describe the difference between 'structure' and 'function'.


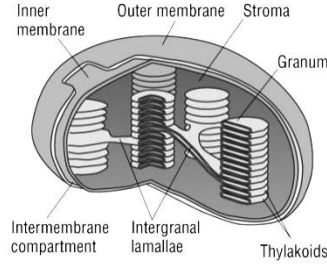
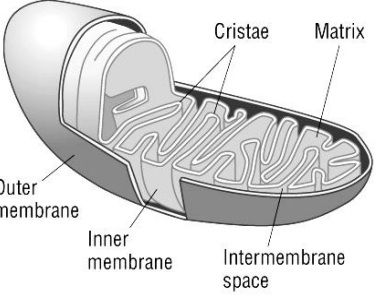
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Task Four: Structure and function of organelles

Complete the structure and function for the following organelles.

Organelle	Diagram	Structure	Function
Rough ER			<ul style="list-style-type: none"> Covered with ribosomes which these synthesize extracellular proteins. The proteins are folded & modified inside the rough ER. The rough ER often transports proteins inside the cell. <p>Vesicles containing the proteins bud off the rough ER to</p>
Chloroplasts		<p>Bound by a double membrane.</p> <p>Medium inside is the STROMA, containing starch grains, lipid droplets and DNA</p> <p>Contains enzymes used in 2nd stage of photosynthesis</p> <p>Membrane bound flattened sacs (THYLAKOIDS) contain chlorophyll. Thylakoids are grouped in stacks called GRANA</p>	
Mitochondria		<ul style="list-style-type: none"> Usually rod-shaped. ~1µm wide and ~7µm long. Bound by a double membrane. The inner membrane is highly folded into cristae. <p>Contain a jelly-like liquid called the matrix.</p>	

Define the term 'organelle'

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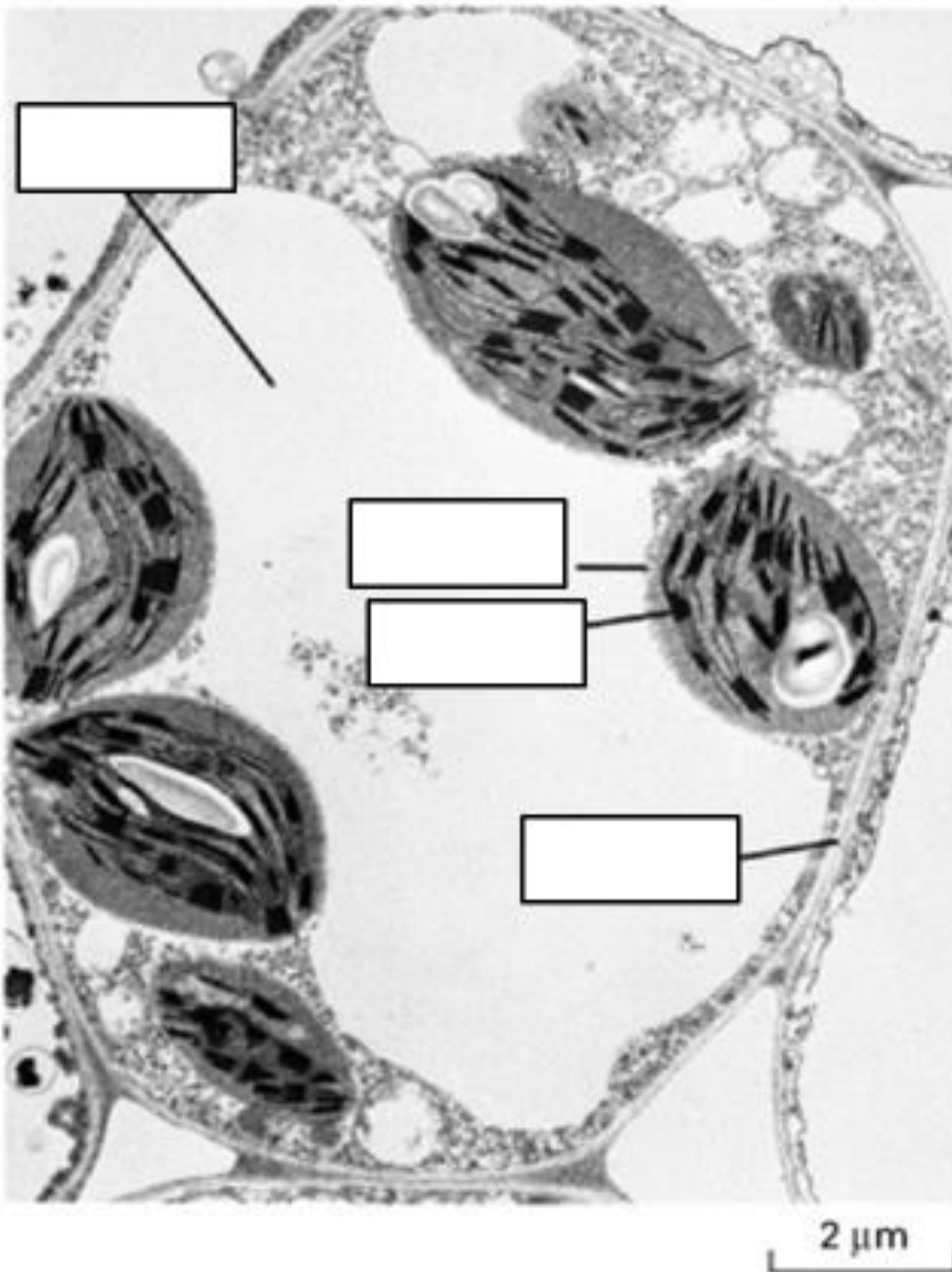
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Task Five: Putting theory into practice

Look at the **photomicrograph** below. Can you label the structures?

(a photomicrograph is an image of a cell or organelle, taken with a powerful microscope. This is normally a transmission electron microscope or a scanning electron microscope as they have excellent resolving power).

(a)



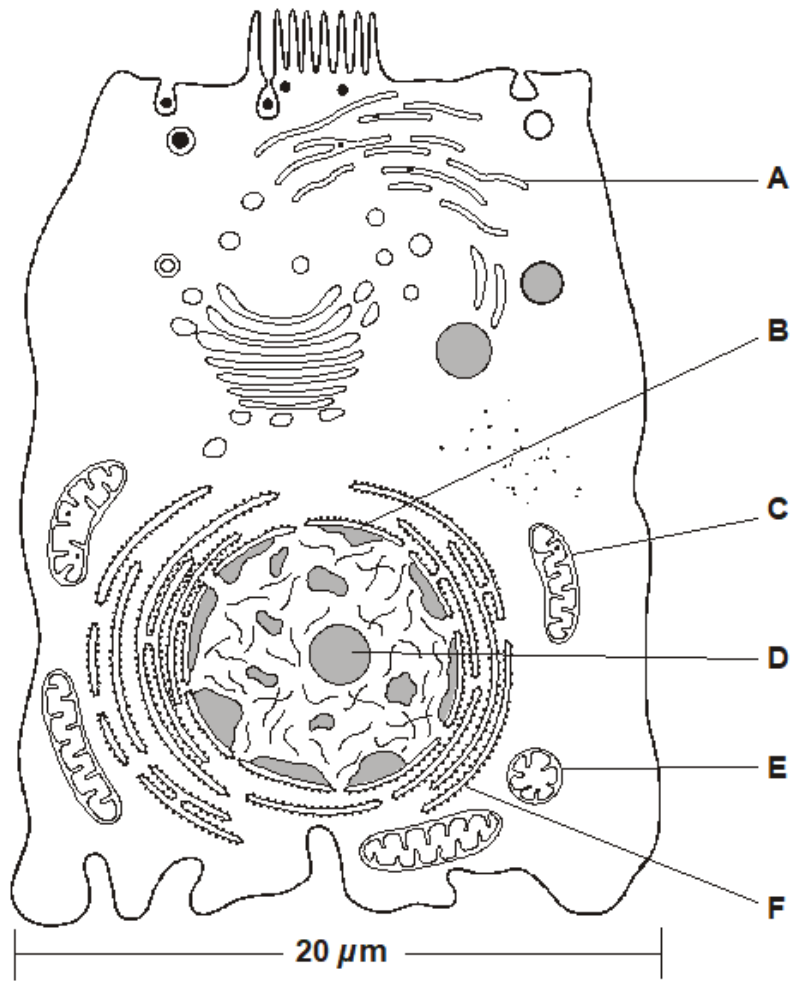
Q: Is this a plant or animal cell? Explain why.

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Task 6: OCR past exam question

Have a go at this past exam question. In biology you must use terminology to obtain marks.

1. The figure below is a diagram of an animal cell as seen using a transmission electron microscope.



- (i) Name the structures of the cell labelled **A**, **B**, **C** and **D**.

A

B

C

D

The table below compares features of typical eukaryotic and prokaryotic cells.

(i) Complete the table by placing one of the following, as appropriate, in each empty box of the table.

- a tick (✓)
- a cross (✗)
- the words 'sometimes present'

Some of the boxes have been completed for you.

	eukaryotic cell	prokaryotic cell
cell wall	sometimes present	✓
nuclear envelope	✓	
Golgi apparatus		✗
ribosomes		✓
flagellum	sometimes present	

(ii) Outline the roles of the Golgi apparatus and the ribosomes.

Golgi apparatus

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[4]

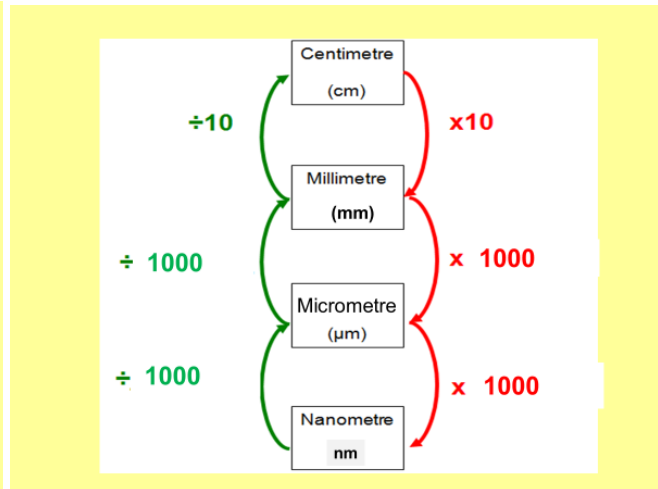
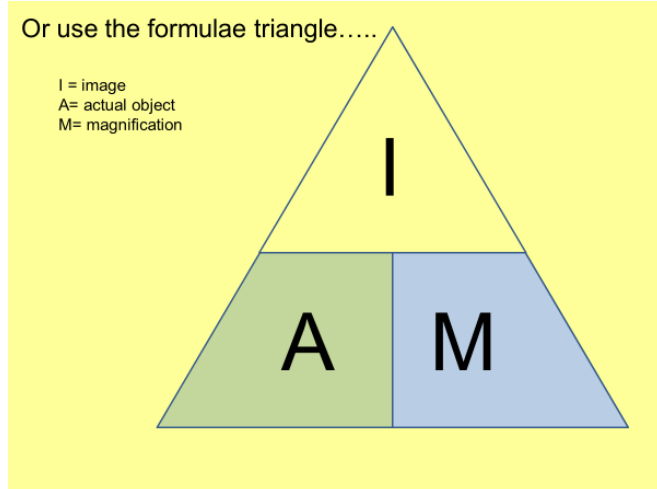
Ribosomes

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[2]

Task Seven: Maths skills

We often need to calculate the size of organelles or cells. To do this we use the following formula:

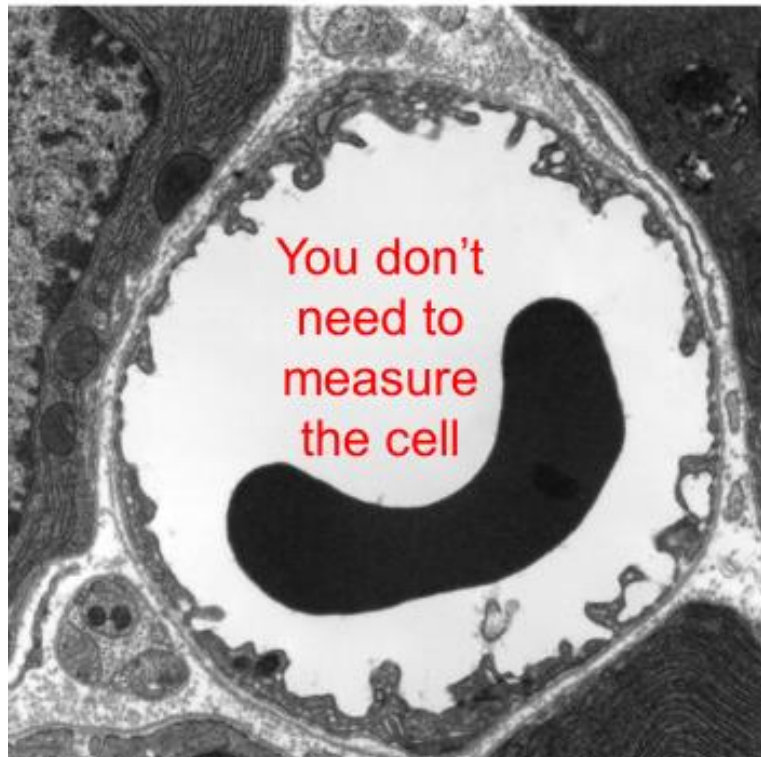


Let's look at an example together.

Worked Example

Calculate the magnification of the erythrocyte.

First make all the units the same: $1\mu\text{m} = 22\text{mm}$, convert



to $\mu\text{m} = 22,000\mu\text{m}$

Then:

$$m = i / a$$

$$m = 22000 / 1$$

$$m = 22,000 \times$$

$1\mu\text{m}$

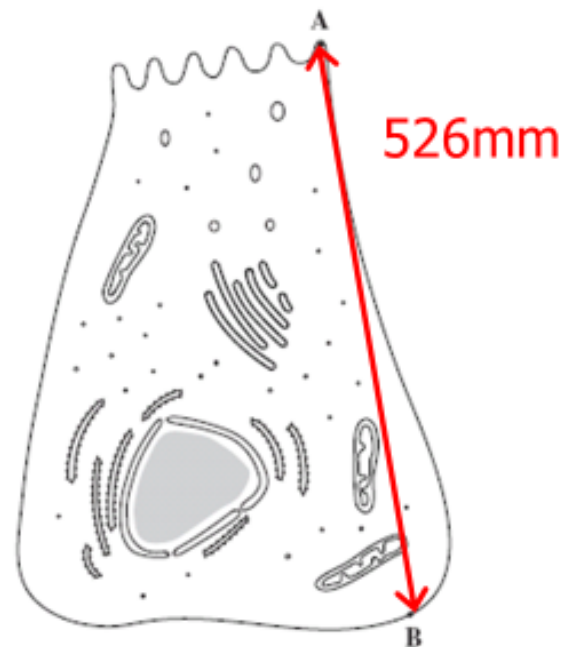


22mm

You try this one – good luck 😊

Worked Example

The drawing shows a cell from the pancreas which has been drawn at a magnification of $\times 10,400$. Calculate the actual length of the cell from **A to B**. Give your answer in micrometres.



“Thank you for choosing AS Biology. We look forward to meeting you in September to begin the journey of life.”

Yours,
Ross Cooper (Biology)

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