Identifying Organelles I

A Level

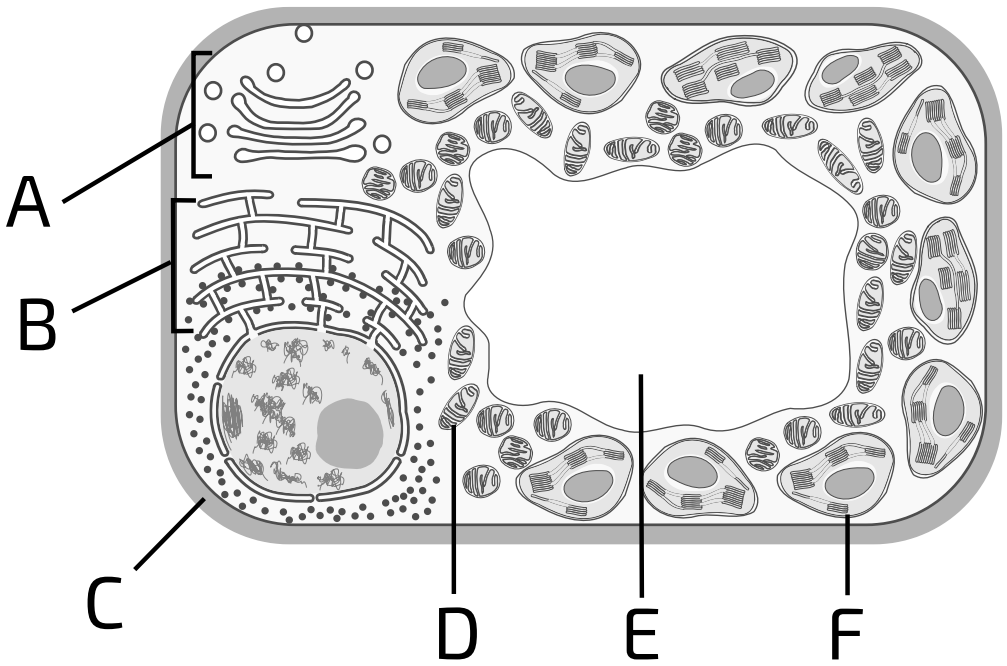

Figure 1: A diagram of a cell.

Part A Name the cell

What kind of cell is shown above?

- Plant cell
- Bacterial cell
- Animal cell

Part B Name the organelle

Match the letter to the organelle/structure.

Letter	Organelle
A	
B	
C	
D	
E	
F	

Items:

vacuole **endoplasmic reticulum** **mitochondrion** **flagellum** **centriole** **chloroplast** **cell wall** **Golgi apparatus**

Part C Structure C

What is structure C made of?

- chitin
- cellulose
- phospholipids
- peptidoglycan
- chlorophyll

Part D Organelle E

What is the name of the membrane that surrounds organelle E?

- capsule
- tonoplast
- cell membrane
- inner membrane
- cisternae

Part E Organelle F

What is the primary role of organelle F?

- keeps the cell turgid
- photosynthesis
- aerobic respiration
- digestion of ingested material

Identifying Organelles II

A Level

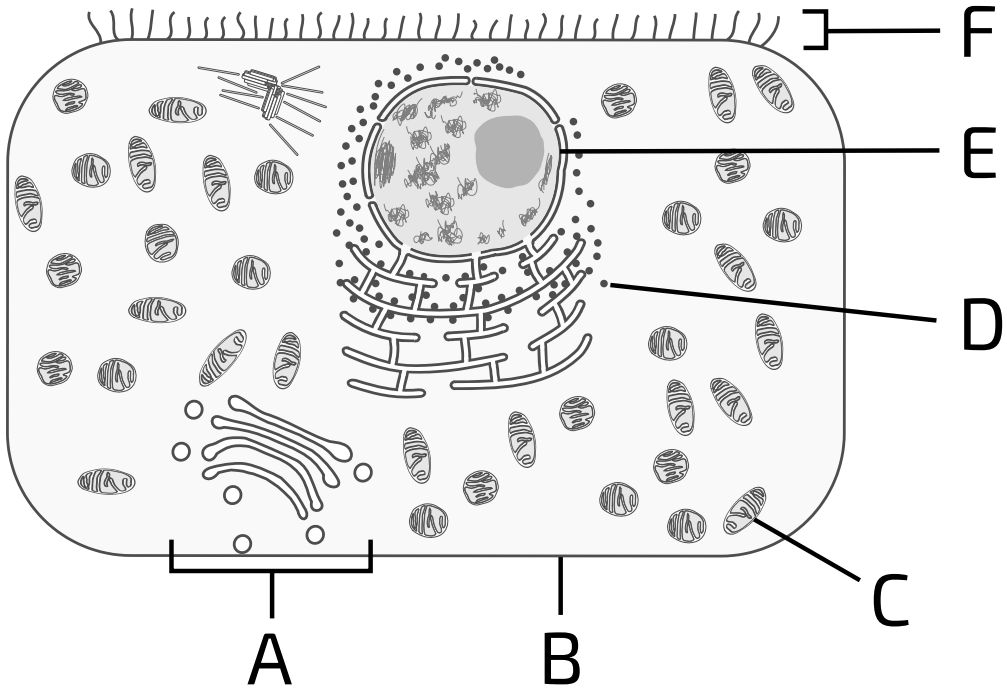

Figure 1: A diagram of a cell.

Part A Name the cell

What kind of cell is shown above?

- Bacterial cell
- Animal cell
- Plant cell

Part B Name the organelle

Match the letter to the organelle/structure.

Letter	Organelle
A	
B	
C	
D	
E	
F	

Items:

cell membrane **Golgi apparatus** **ribosome** **plasmid** **cilia** **nucleoid** **mitochondrion** **vacuole** **nucleus**

Part C Organelle A

What are the names of the structures that organelle A is made of?

- centrioles and vesicles
- centrioles and vacuoles
- cristae and vesicles
- cisternae and vesicles
- cisternae and vacuoles
- cristae and vacuoles

Part D Organelle C

What is the primary role of organelle C?

- aerobic respiration
- photosynthesis
- anaerobic respiration
- digestion of ingested material

Part E Structure F

What is the structure of each unit of F?

- Nine microtubule triplets arranged in a ring.
- Nine single microtubules arranged in a ring, surrounded by cell membrane.
- Nine microtubule triplets arranged in a ring, surrounding a central pair of microtubules, all surrounded by cell membrane.
- Nine microtubule doublets arranged in a ring, surrounding a central pair of microtubules, all surrounded by cell membrane.

Identifying Organelles III

A Level

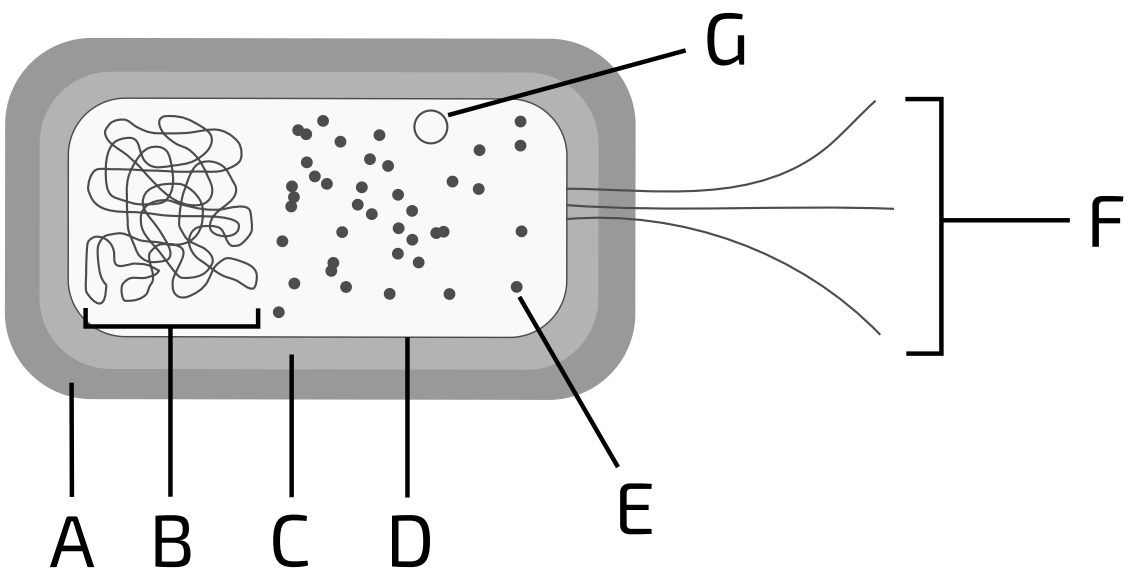

Figure 1: A diagram of a cell.

Part A Name the cell

What kind of cell is shown above?

- Bacterial cell
- Plant cell
- Animal cell

Part B Name the organelle

Match the letter to the organelle/structure.

Letter	Organelle/structure
A	
B	
C	
D	
E	
F	
G	

Items:

flagella **cilia** **plasmid** **nucleus** **cell membrane** **capsule** **ribosome** **nucleoid** **cell wall** **chloroplast**

Part C Structure C

What is structure C made of?

- chitin
- phospholipids
- cellulose
- peptidoglycan

Part D Organelle E

What is the primary function of organelle E?

- post-translational modification of proteins
- translation
- DNA replication
- transcription

Part E Structure F

What is the primary role of F?

- cell movement
- moving organelles around the cell
- moving fluid along the tissue
- cell contraction

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Gameboard:

STEM SMART Biology Week 14

Organelles Overview

A Level

Part A Organelle functions I

The table below lists some organelles/cell structures. Match the organelle/cell structure to the function.

Organelle	Function
	where DNA is contained, replicated and transcribed
	where aerobic respiration takes place
	regulates transport of substances into/out of the cell
	where photosynthesis takes place
	where lipids and carbohydrates are synthesised and stored
	where translation takes place

Items:

mitochondria **ribosomes** **cell membrane** **nucleus** **smooth endoplasmic reticulum**

chloroplasts

Part B Organelle functions II

The table below lists some organelles/cell structures. Match the function to the organelle/cell structure.

Organelle	Function
	contain and transport digestive enzymes
	modifies proteins that will be secreted from the cell
	provides protection and support to the cell
	organises the spindle fibres during cell division
	stores sugars and amino acids, and helps keep the cell turgid
	enables the cell to move through its environment
	move fluid along the tissue

Items:

cilia **centrosome** **Golgi apparatus** **cell wall** **central vacuole** **lysosomes** **flagellum**

Part C Single membranes

Which of the following are bound by a single-membrane?

- [ ] nucleus
- [ ] endoplasmic reticulum
- [ ] ribosome
- [ ] Golgi apparatus
- [ ] vesicle
- [ ] mitochondrion
- [ ] chloroplast
- [ ] a eukaryotic cell
- [ ] nucleoid

Part D Double membranes

Which of the following are bound by a double membrane?

- [ ] nucleus
- [ ] endoplasmic reticulum
- [ ] ribosome
- [ ] Golgi apparatus
- [ ] vesicle
- [ ] mitochondrion
- [ ] chloroplast
- [ ] a eukaryotic cell
- [ ] nucleoid

Part E Non-membrane-bound organelles

Which of the following are not bound by a membrane?

- [ ] nucleus
- [ ] endoplasmic reticulum
- [ ] ribosome
- [ ] Golgi apparatus
- [ ] vesicle
- [ ] mitochondrion
- [ ] chloroplast
- [ ] a eukaryotic cell
- [ ] nucleoid

Question elements adapted with permission from OCR A Level January 2003, Biology Foundation Paper, Question 1b. Other question elements created for isaacphysics.org by Lewis Thomson.

Gameboard:
STEM SMART Biology Week 14

Matching micrographs to microscopes

A Level

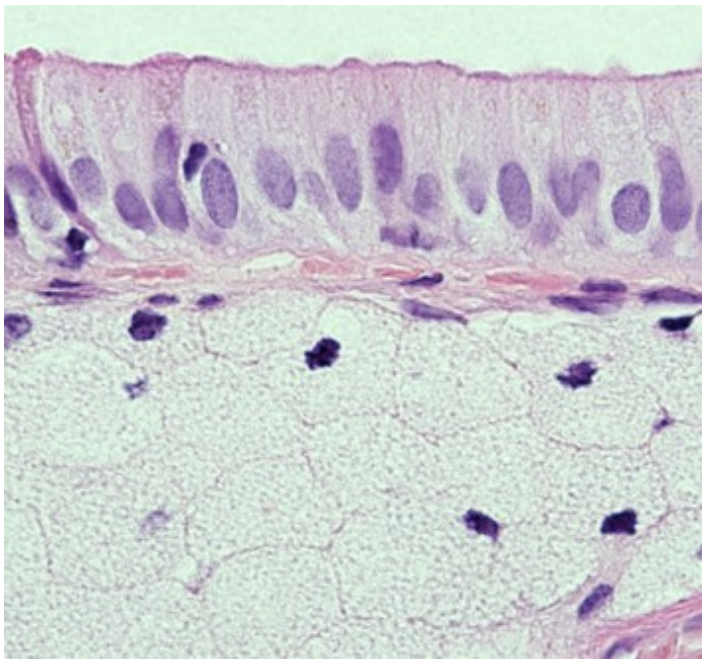

Figure 1: Microscope image (micrograph) of a section of the human gallbladder wall. The top part of the image shows a layer of epithelial cells, with nuclei stained purple.

Image by William Karkow (Public Domain). CIL: 34859.

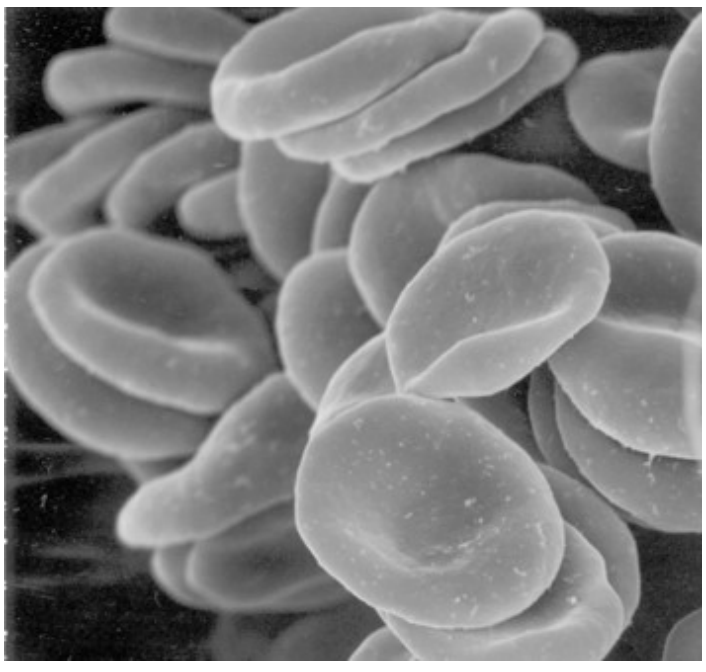

Figure 2: Microscope image (micrograph) of human red blood cells.

Image by Tina Carvalho (Public Domain). CIL: 221.

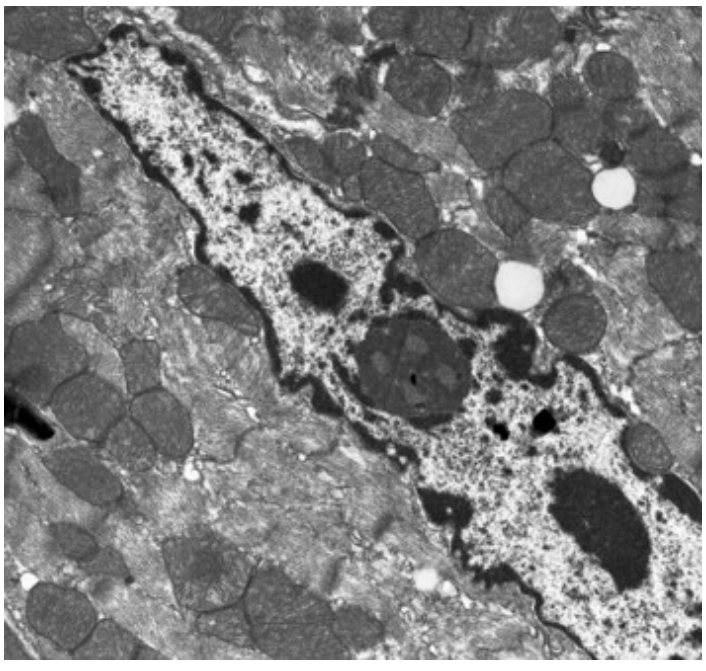

Figure 3: Microscope image (micrograph) of a mouse cardiac cell. The large membrane-bound structure which stretches from top-left to bottom-right is the nucleus, and the nucleolus is visible in the centre of this.
Image by Dee Lauzon, Sue Lancelle, and Marian Rice (Public Domain). CIL: 39755.

Part A Light microscope

Which figure above shows an image taken with a light microscope?

- Figure 1
- Figure 2
- Figure 3

Part B Transmission electron microscope (TEM)

Which figure above shows an image taken with a transmission electron microscope (TEM)?

- Figure 1
- Figure 2
- Figure 3

Part C Scanning electron microscope (SEM)

Which figure above shows an image taken with a scanning electron microscope (SEM)?

- Figure 1
- Figure 2
- Figure 3

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STEM SMART Biology Week 14

Nutrient Solution

A Level
C C C

A scientist conducts an experiment to study a single-celled organism in a growth tube.

The organism divides once every 50 minutes using binary fission. Binary fission produces the same number of daughter cells per division as a cell dividing by mitosis.

The scientist starts with 150 cells. The experiment is left for 300 minutes.

The average volume of each cell is $5\ \mu\text{m}^3$.

To ensure there are sufficient nutrients available for the cells, the final volume of cells within the tube must not be more than $1\ \%$ of the total volume of material inside the tube.

What is the minimum volume of nutrient solution required inside the growth tube at the start of the experiment?

Assume that all the cells are alive and capable of dividing.

Adapted with permission from NSAA 2021 Section 2 Q52