

A. Cell structure part 1 – Eukaryotes, prokaryotes and animal and plant cells

1. Where is the genetic material in a prokaryotic cell?

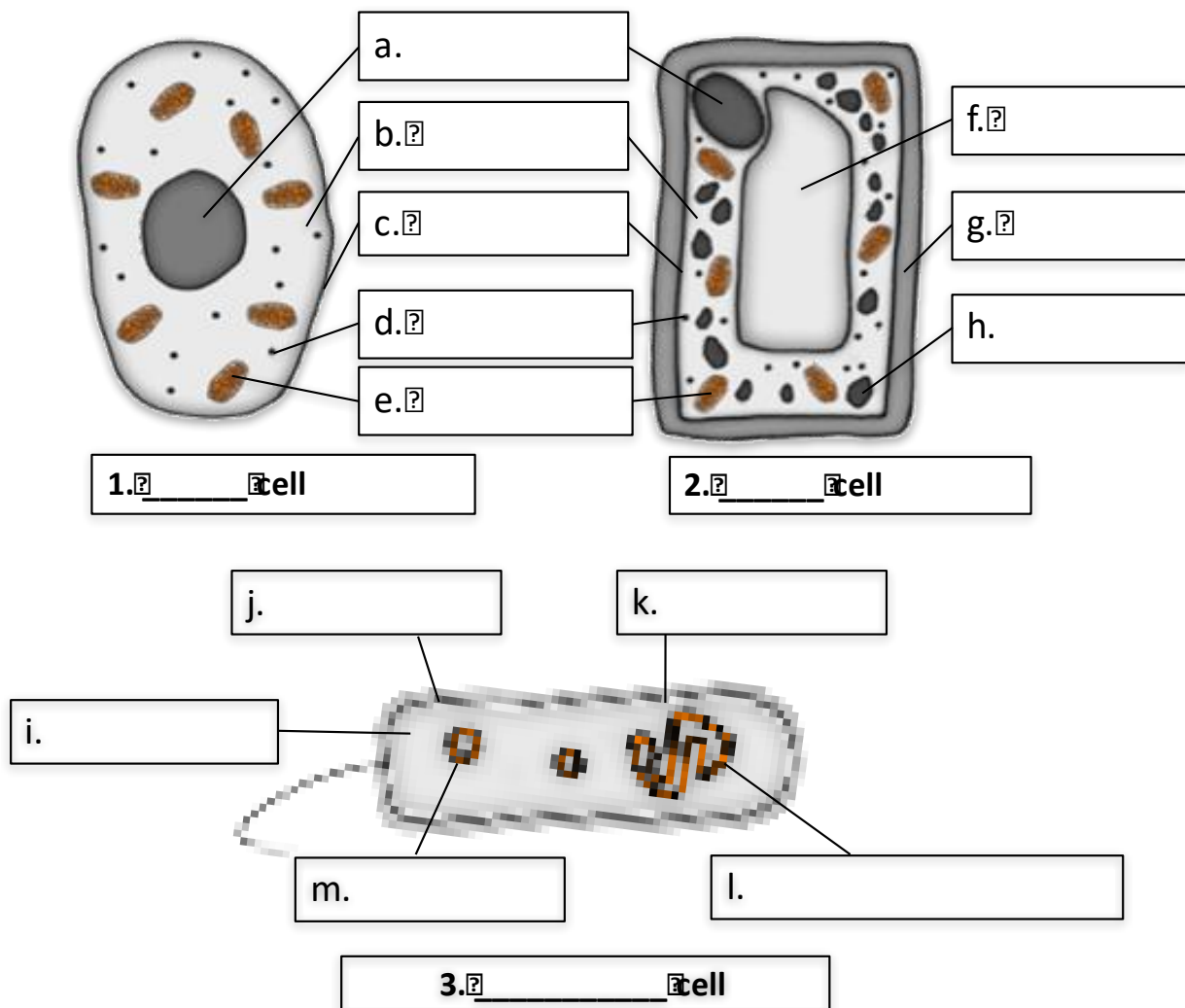
2. Where is the genetic material in a eukaryotic cell?

3. Complete the table.

Prefix	Multiple	Standard form
centi (cm)		$\times 10^{-2}$
	1 mm = 0.001 m	$\times 10^{-3}$
micro (μm)	1 μm = 0.000 001 m	
nano (nm)		$\times 10^{-9}$

4. Why do scientists use prefixes?

5. Name the structures **a** to **l** on the diagrams below and label cells 1,2 and 3.

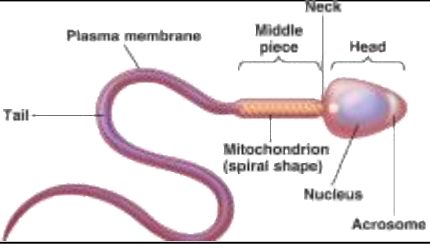
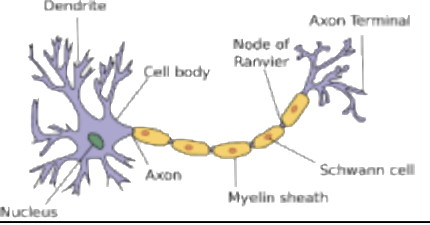



6. Complete the table and tick the correct column for each one.

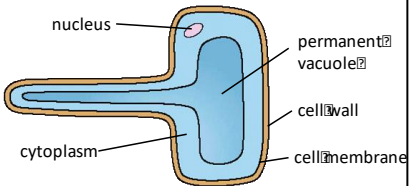
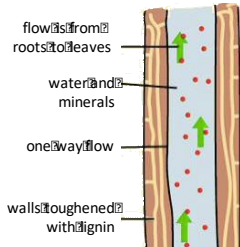
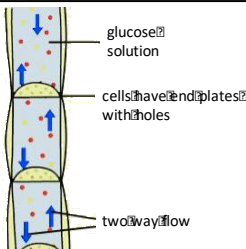
Cell part	Function	Animal	Plant	Bacteria
	Contains genetic material, which controls the activities of the cell			
Cytoplasm				
	Controls the movement of substances into and out of the cell			
	Most energy is released by respiration here			
Ribosomes	Protein synthesis happens here			
	Strengthens the cell - made of cellulose			
Chloroplasts				
	Filled with cell sap to help keep the cell turgid			
	Loop of DNA NOT found in a nucleus			
Plasmid (DNA)				

B. Cell structure part 2 - Cell specialisation and cell differentiation

1. Name animal cells A, B and C and describe their structure and function.

Name of animal cell	Diagram	Structure and function
A.		
B.		
C.		

2. Name plant cells A,B and C and describe their structure and function.

Name of plant cell	Diagram	Structure and function
A.	 <p>nucleus permanent vacuole cytoplasm cell wall cell membrane</p>	
B.	 <p>flow is from roots to leaves water and minerals one way flow walls toughened with lignin</p>	
C.	 <p>glucose solution cells have end plates with holes two way flow</p>	

3. What does cell differentiation mean?

4. In what stage of an animal's life cycle do most cells differentiate?

5. In mature animals when do cells still need to differentiate?

6. In what stage of their life cycle do plant cells differentiate?

C. Cell structure part 3 – Microscopy and culturing microorganisms (bio only)

1. Define the term resolution.

2. Copy and complete the table below.

Feature	Light (optical) microscope	Electron microscope
Radiation used		
Max magnification		
Resolution		
Size of microscope		
Cost		

3. What are the advantages of the electron microscope?
4. What are smallest cell structures that can be seen by the light microscope?
5. What are smallest cell structures that can be seen by the electron microscope?
6. Write down the magnification equation.
7. Rearrange the equation to change the subject for the two other factors.
8. A magnified cell structure has a diameter of $375\mu\text{m}$.

The actual diameter of the structure is $2.5\mu\text{m}$.

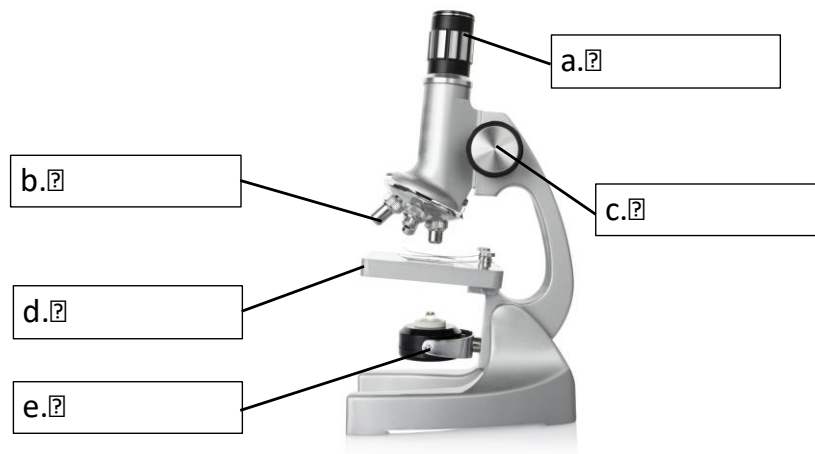
Calculate how many times the structure has been magnified.

9. The actual length of a cell structure is $3\mu\text{m}$.

It is magnified 1500 times.

Calculate the length of the magnified cell structure in mm.

10. Name the parts of the light microscope in the diagram below.



11. How you would make an onion cell slide?
12. How you would use the light microscope to view onion cells?

Biology ONLY

Bio 13. What is binary fission?

Bio 14. Why do you need to sterilise petri dished and culture mediums before use?

Bio 15. What would you use an inoculating loop for?

Bio 16. How do you sterilise and inoculating loop?

Bio 17. How would you secure the lid of the petri dish?

Bio 18. What temperature would you incubate the samples at in a school and why should you use this temperature?

Bio 19. How can you test the effectiveness of antibiotics and disinfectants on bacteria?

Bio 20. What is the zone of inhibition?

D. Cell division

1. What are chromosomes?
2. What is a gene?
3. What is DNA?
4. Where in a cell do you find chromosomes?
5. How many chromosome pairs do you find in a human body cell?
6. What are the three stages of the cell cycle?
7. What is mitosis and what is it used for in animals and plants?
8. What is a stem cell?
9. Which type of human stem cell can differentiate into any human cell?
10. What is therapeutic cloning?
11. What are the risks of therapeutic cloning?
12. State two reasons why people may object to the use of stem cells in therapeutic cloning.
13. What are meristems?
14. State two reasons that plants are cloned.

E. Transport in cells

1. Define diffusion.
2. State 3 places where diffusion occurs in the body.
3. What is a concentration gradient?

4. What 3 factors affect the concentration gradient?
5. What is surface area to volume ratio?
6. Which has the largest surface area to volume ratio an elephant or a meerkat?
7. State how the following are adapted for diffusion:
 - a. The small intestines.
 - b. The lungs.
 - c. Gills in fish.
 - d. Root.
 - e. Leaves.
8. Define osmosis.
9. What is a 'partially permeable membrane'?
10. What happen to an animal cell in a hypertonic solution?
11. What happens to an animal cell in a hypotonic solution?
12. Define 'active transport'.
13. Why does active transport need to occur in root hair cells?
14. Why does active transport need to occur in the gut?