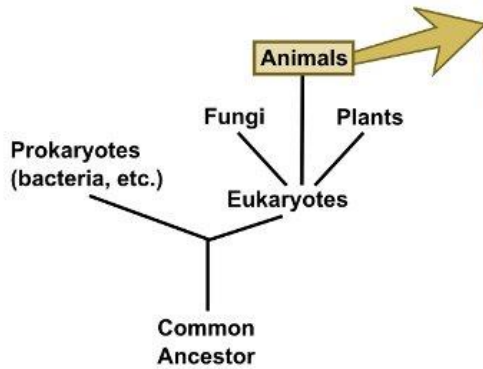
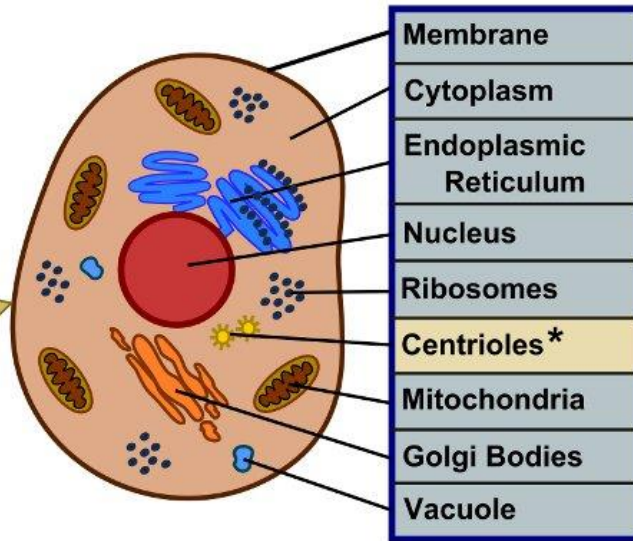


Name: _____

Eukaryotes
 Plant and animal cells are both Eukaryotic (which means that the cells contain a nucleus), and have many structures and functions in common. Compare this animal cell to the plant cell in the diagram below.

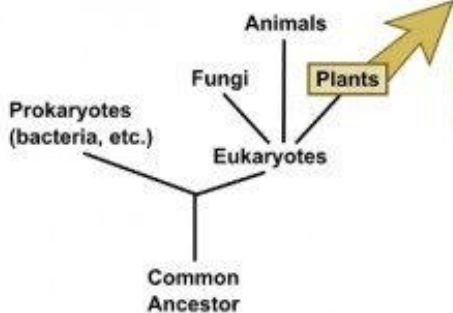


Animal Cell

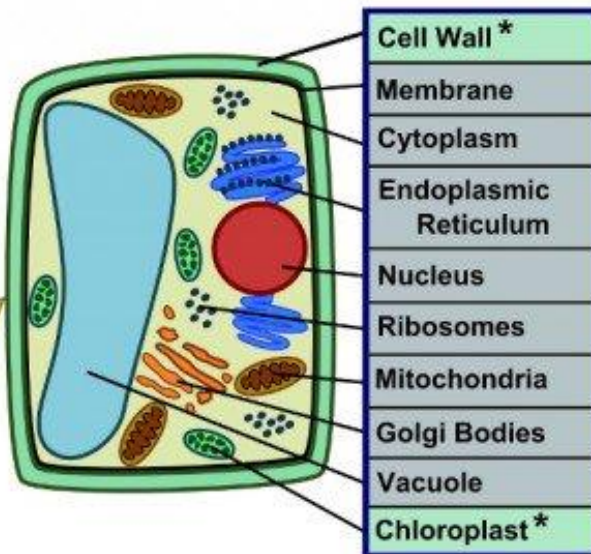


* Centrioles are unique to animal cells

Primary Differences
 Plant cells need to perform two functions not performed by animal cells:
 1. produce their own food
 2. support their own weight
 These account for the primary differences between plant and animal cells.



Plant Cell



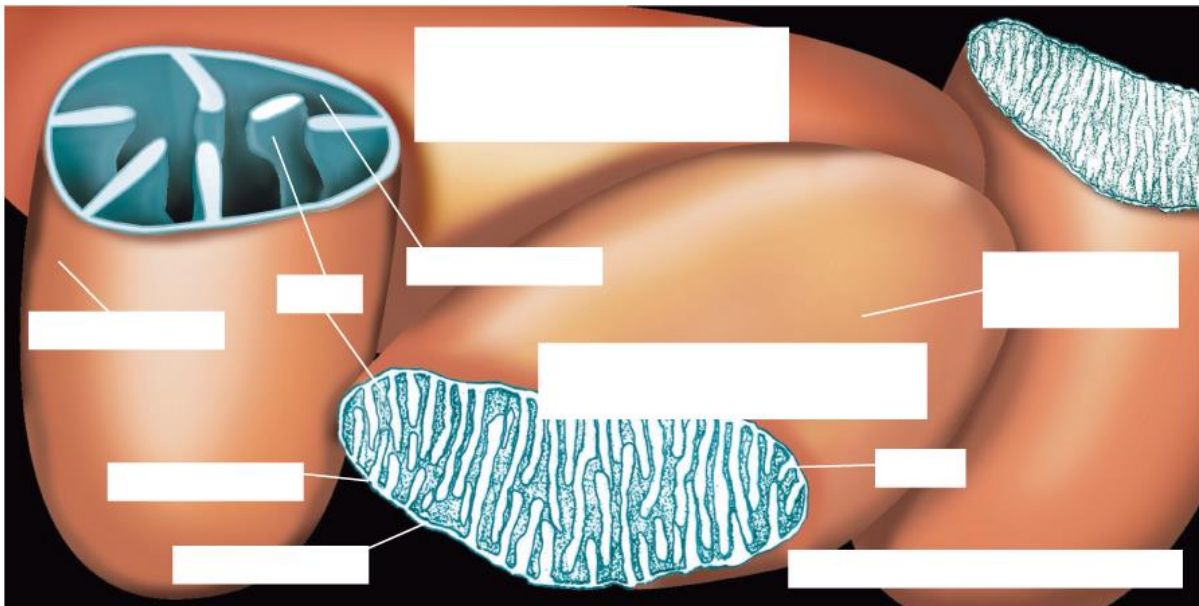
* unique to plant cells

Task 1: Draw and annotate a Eukaryotic cell with the following organelles and describe their function:

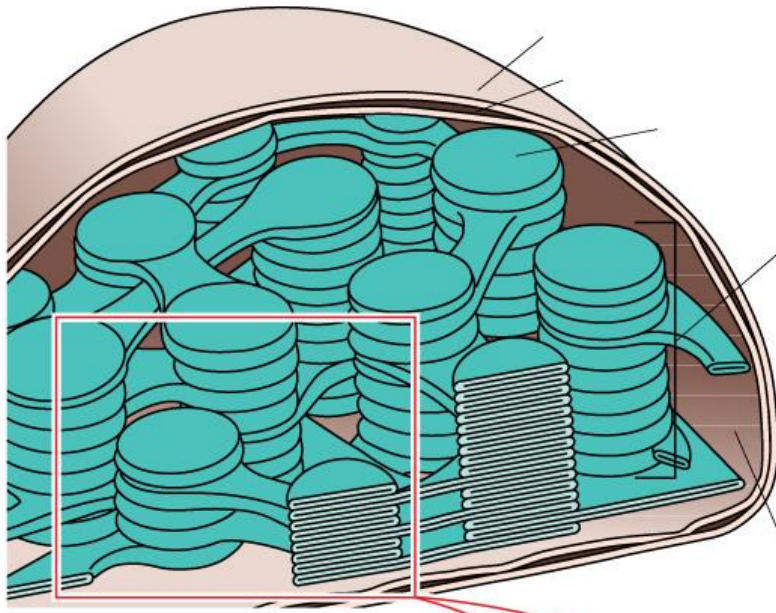
- cell-surface membrane
- nucleus
- mitochondria
- chloroplasts
- Golgi apparatus and Golgi vesicles
- lysosomes
- ribosomes
- rough endoplasmic reticulum and smooth endoplasmic reticulum
- cell wall
- cell vacuole

NB this may be easier to do on a separate piece of paper.

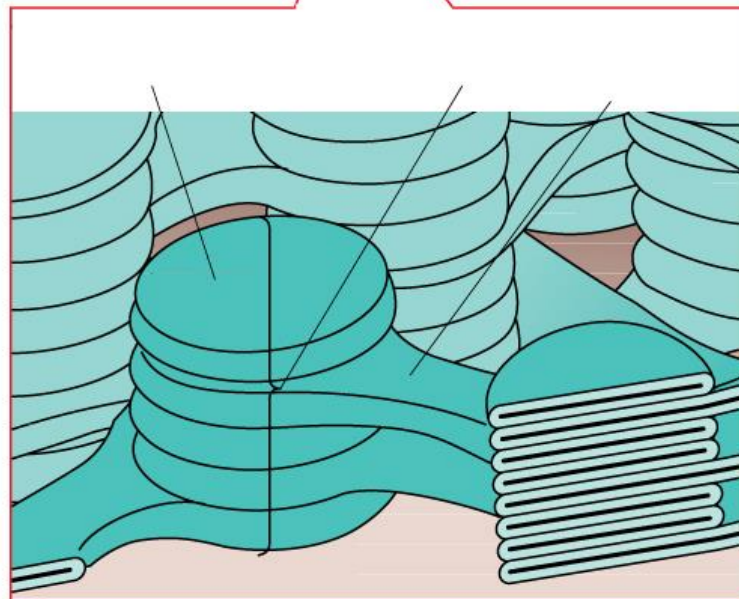
Mitochondria



Chloroplast

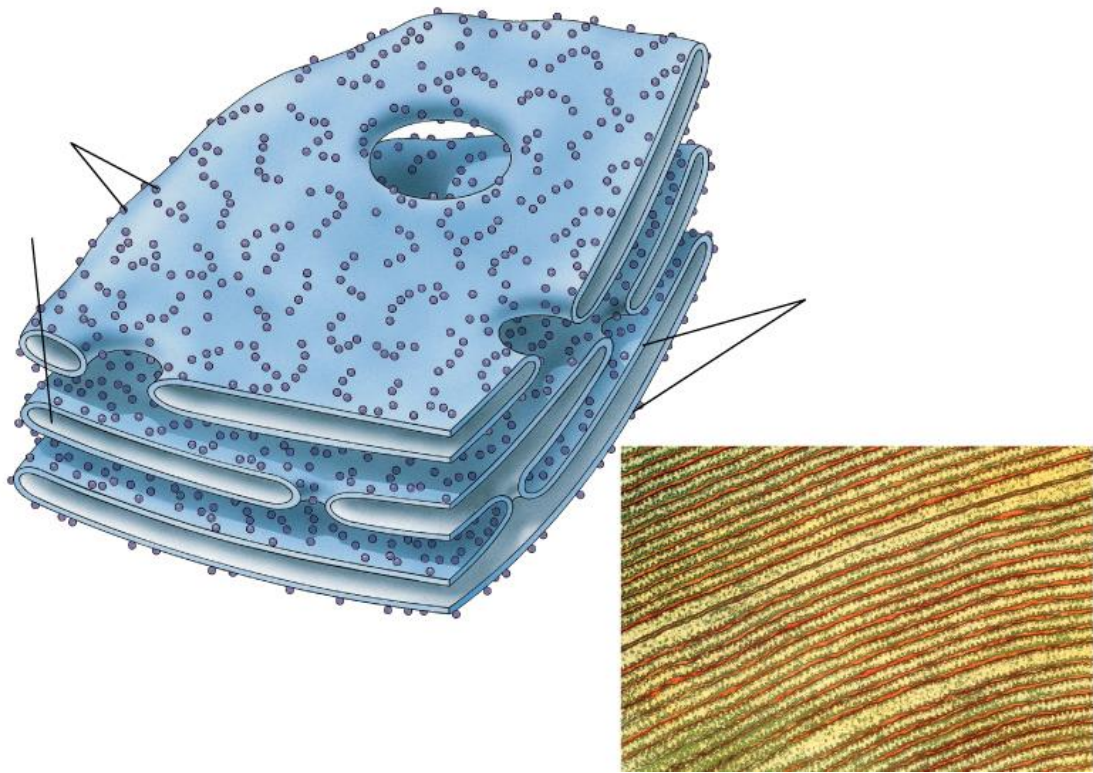


a Chloroplast structure



b Grana and thylakoids

RER



Summary questions

- 1 State in which process ribosomes are important.
- 2 List **three** carbohydrates that are absorbed by an epithelial cell of the small intestine.
- 3 State the organelle that is being referred to in each of the following descriptions:
 - a It possesses structures called cristae.
 - b It contains chromatin.
 - c It synthesises glycoproteins.
 - d It digests worn out organelles.
- 4 The following list gives a type of cell and a brief description of its role. Suggest **two** organelles that might be numerous and/or well developed in each of the cells.
 - a A sperm cell swims a considerable distance carrying the male chromosomes.
 - b One type of white blood cell engulfs and digests foreign material.
 - c Liver cells manufacture proteins and lipids at a rapid rate.

Task 2: Complete the table of how prokaryotic cells differ from eukaryotic cells, include an **annotated diagram**. NB a separate piece of paper is recommended.

Prokaryotic cells	Eukaryotic cells
no true nucleus, only an area where DNA is found	
(Pro) DNA is not associated with proteins	
some DNA may be in the form of circular strands called plasmids	
no membrane-bounded organelles	
no chloroplasts, only bacterial chlorophyll associated with the cell-surface membrane in some bacteria	
ribosomes are smaller (70S)	
cell wall made of murein (peptidoglycan)	
may have an outer mucilaginous layer called a capsule	

Summary questions

- 1 Explain what is meant by a tissue.
- 2 Explain why an artery is described as an organ whereas a blood capillary is not.
- 3 State whether each of the following is a tissue or an organ.
 - a heart
 - b xylem
 - c lungs
 - d epithelium.

Task 3: Explain what is meant by viruses being acellular and non-living. Describe the structure of virus particles, draw and annotate this.

Task 4: Complete the table and answer the questions

Type of microscope	Light microscope	Transmission electron microscope	Scanning electron microscope
Describe how this type of microscope produces an image.			
Describe the advantages of the microscope			
Describe the disadvantages of the microscope			

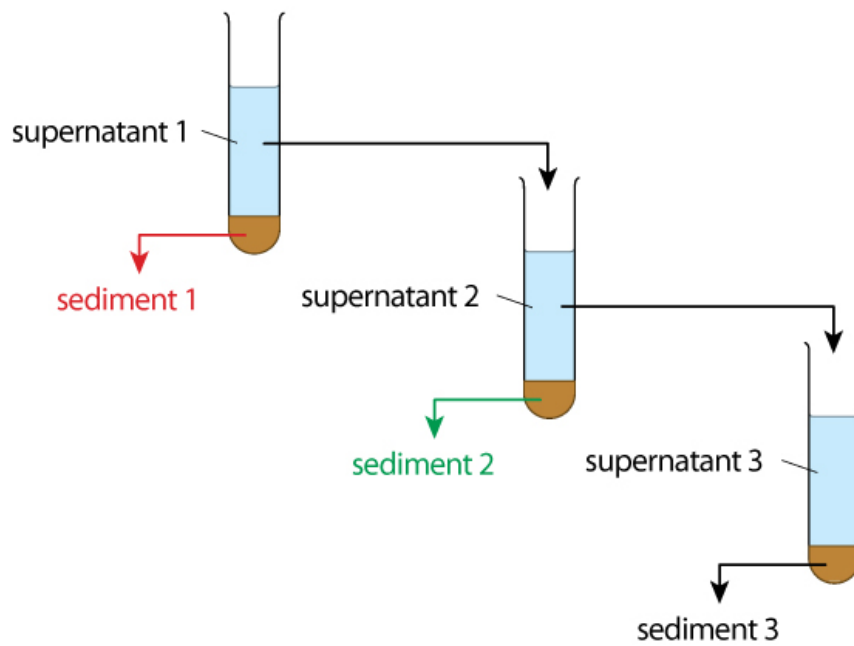
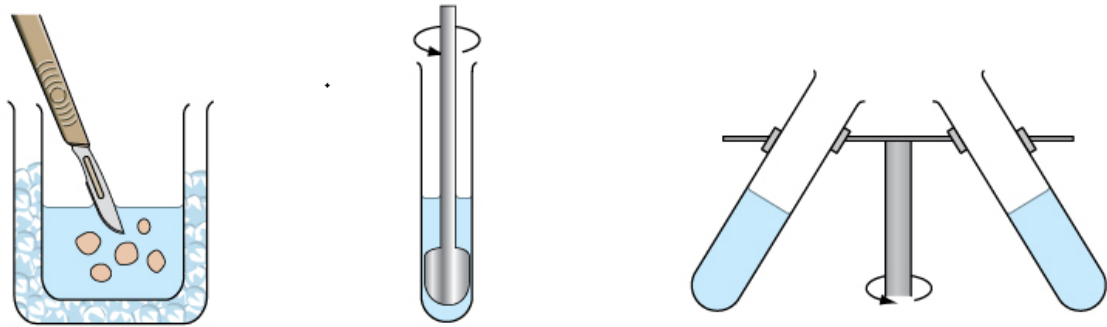
Questions

- 1 Microscopes are common instruments used by biologists. State what is meant by the terms:
 - a magnification (1 mark)
 - b resolution. (1 mark)

Summary questions

- 1 Explain how the electron microscope is able to resolve objects better than the light microscope.
- 2 Explain why specimens have to be kept in a near-vacuum in order to be viewed effectively using an electron microscope.
- 3 State which of the biological structures in the following list can be resolved using each of the microscopes below:
plant cell (100 μm) DNA molecule (2 nm) virus (100 nm)
actin molecule (3.5 nm) a bacterium (1 μm)
 - a a light microscope
 - b a transmission electron microscope
 - c a scanning electron microscope.
- 4 In practice, the theoretical resolving power of an electron microscope cannot always be achieved. Explain why not.
- 5 \sqrt{x} In a photomicrograph, an organelle measures 25 mm when its actual size is 5 μm . Calculate the magnification of this photomicrograph.

Task 5: Describe the principles of cell fractionation and ultracentrifugation in separating cell components.



Explain how the scientific community previously distinguished between artefacts and cell organelles.

Summary questions

In the following passage, state the missing word indicated by each letter **a–h**.

To measure the size of an object under a **a** microscope you can use an **b** graticule and a **c** micrometer. Before you can use the graticule to measure the size of objects it must first be **d**. To do this you line up the scale on the eyepiece with that on the micrometer using an objective lens that magnifies 400 times. Suppose this shows that 50 graticule units are equivalent to 10 micrometer units. If each micrometer unit is $10\ \mu\text{m}$, then each graticule unit equals **e** μm . If an objective lens magnifying 100 times is used, each graticule unit would be equivalent to **f** μm . A photograph of a cell under an electron microscope is magnified 5000 times. On the photograph the nucleus measures 100 mm in diameter. The actual size of the nucleus is therefore **g** μm . A chloroplast that is $5\ \mu\text{m}$ in diameter measures 15 mm in a drawing made of a plant cell as seen under a microscope. The magnification of this drawing is therefore **h** times.