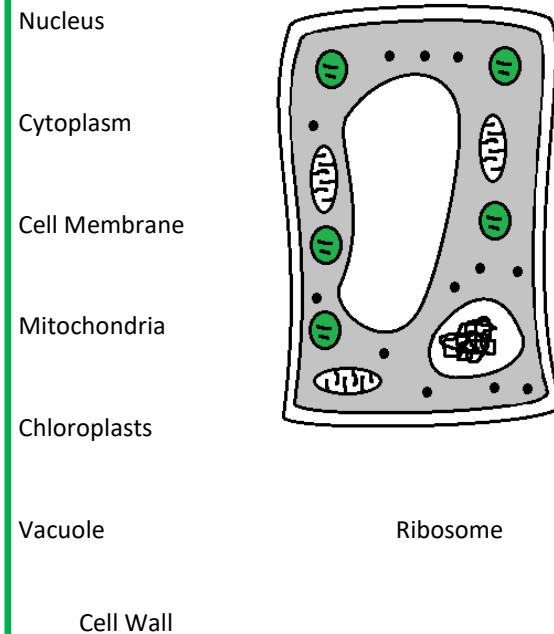


Paper 1

Chapter 1 — Cell Biology

Typical Plant Cell Organelles

Draw arrows and add functions to each label



Specialised Cells

How is each cell different from a typical plant/animal cell?

Prokaryote Bacterial cell -

Sperm cells -

Nerve cells -

Muscle cells -

Root hair cells -

Xylem cells -

Phloem cells -

Stem Cells

A stem cell is an u_____ cell that can be copied or change into other cell types.

Stem cells from human e_____ can differentiate into most different types of human cells.

Stem cells from adult b___ m_____ can form cells including b_____ cells.

M_____ cells in plants can differentiate into any type of plant cell.

Stem cells may be able to help treat d_____ and p_____.

In t_____ cloning an embryo is produced with the same DNA as the patient. Stem cells from the embryo are not r_____ as they have the same DNA and antigens as the patient.

Risks from stem cell treatment include the transfer of v_____ pathogens, and some people have e_____ or r_____ objections.

Plant meristem stem cell can be used to produce clones of plants q_____ and e_____.

R_____ species can be cloned to protect from e_____.

It is possible to clone large numbers of identical Crop plants with desirable features such as d_____ resistance or high crop y_____.

Diffusion

Diffusion is the s_____ out of particles. It involves the n__ movement of particles from an area of higher c_____ to an area of lower c_____. Particles can move by diffusion if they are dissolved in s_____ or g___ particles.

O_____ diffuses from the air to the blood in the lungs and then from the blood into cells for r_____. C_____ d_____ is produced by r_____ in the cells and then moves from the cells to the blood and then from the blood to the air by d_____.

3 Factors that increase the rate of diffusion into cells:

-
-
-

Active Transport

Active transport moves substances from a more d_____ solution to a more c_____ solution (against the c_____ g_____). This requires e_____ from r_____.

Active transport allows m_____ i_____ to be absorbed into plant root hairs from very d_____ solutions in the soil.

It also allows sugar molecules to be absorbed from l_____ concentrations in the gut into the blood which has a h_____ sugar concentration.

Sugar molecules are used for cell r_____.

Required Practical—Microscopes

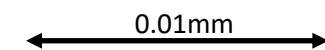
Label the diagram

What is the magnification of the microscope?

Complete the equation,

magnification =

Calculate the magnification of the arrow



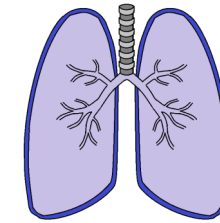
Put these numbers in standard form 7,600,000,000µm 0.0000000045m

An electron microscope has higher m_____ and r_____ p_____ than a light microscope.

Why should you move the lens away from the slide to focus rather than towards?

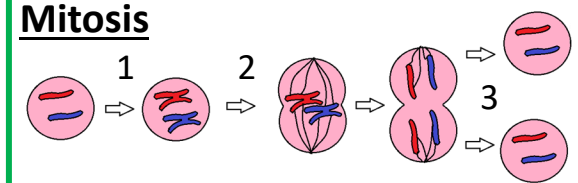
Diffusion Rate

Name 4 adaptations to increase the rate of gas diffusion in the lungs



-
-
-
-

Mitosis



What happens to each of the following at the numbered stages?

Stage 1 - Ribosomes and Mitochondria -

Stage 1 - The DNA -

Stage 2 - Chromosomes and Nucleus -

Stage 3 - Cytoplasm and Cell Membrane -

Osmosis Experiment

Water may move across cell membranes via o_____.

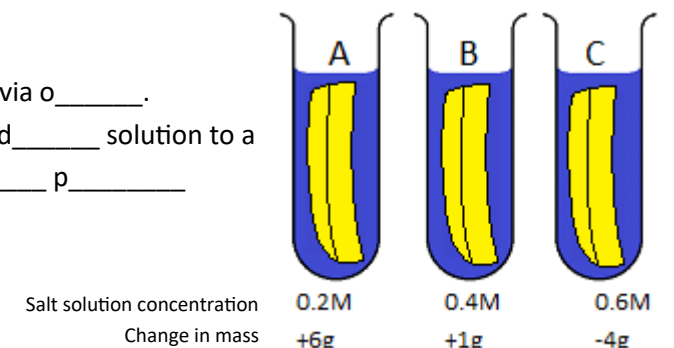
O_____ is the diffusion of water from a d_____ solution to a c_____ solution through a p_____ p_____ membrane.

Why did tube A potato gain mass?

Why did tube C potato lose mass?

What is the % change if the potato changed from 84g to 90g?

Estimate the concentration of solutions inside the potato.

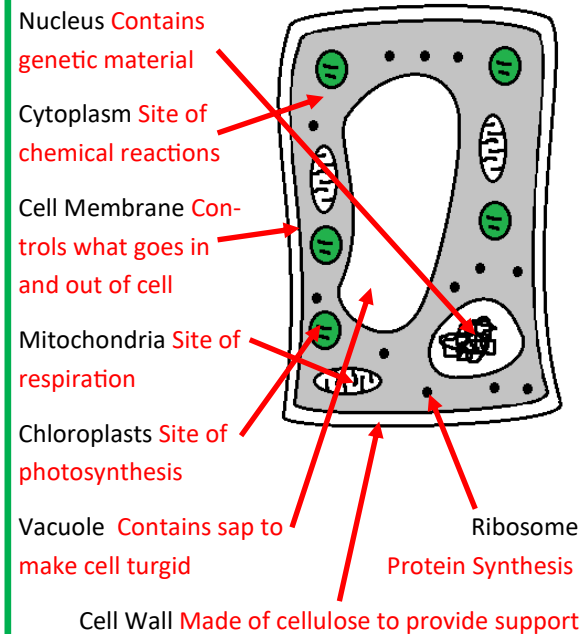


Paper 1

Chapter 1 — Cell Biology

Typical Plant Cell Organelles

Draw arrows and add functions to each label



Specialised Cells

How is each cell different from a typical plant/animal cell?

Prokaryote Bacterial cell - Smaller than other cells, No nucleus, DNA Loop Chromosomes, DNA Plasmids, Non-cellulose cell wall

Sperm cells - Tail, Many mitochondria, 1/2 set of DNA (Only 23 chromosomes)

Nerve cells - Axons to carry electrical impulses, Insulating myelin sheath

Muscle cells - many mitochondria, can contract to cause movement

Root hair cells - small thin extension to increase surface area

Xylem cells - dead plant cells, joined in hollow tubes, carry water (transpiration), strengthened by lignin

Phloem cells - living, make tubes, have sieve plates, carry glucose (translocation)

Stem Cells

A stem cell is an **undifferentiated** cell that can be copied or change into other cell types.

Stem cells from human **embryos** can differentiate into most different types of human cells.

Stem cells from adult **bone marrow** can form cells including **blood** cells.

Meristem cells in plants can differentiate into any type of plant cell.

Stem cells may be able to help treat **diabetes** and **paralysis**.

In **therapeutic** cloning an embryo is produced with the same DNA as the patient. Stem cells from the embryo are not **rejected** as they have the same DNA and antigens as the patient.

Risks from stem cell treatment include the transfer of **viral** pathogens, and some people have **ethical** or **religious** objections.

Plant meristem stem cell can be used to produce clones of plants **quickly** and **economically**.

Rare species can be cloned to protect from **extinction**.

It is possible to clone large numbers of identical Crop plants with desirable features such as **disease** resistance or high crop **yield**.

Diffusion

Diffusion is the **spreading** out of particles. It involves the **net** movement of particles from an area of higher **concentration** to an area of lower **concentration**. Particles can move by diffusion if they are dissolved in **solution** or **gas** particles.

Oxygen diffuses from the air to the blood in the lungs and then from the blood into cells for **respiration**. **Carbon dioxide** is produced by **respiration** in the cells and then moves from the cells to the blood and then from the blood to the air by **diffusion**.

3 Factors that increase the rate of diffusion into cells:

- **higher difference in concentrations** (higher concentration gradient)
- **higher temperature**
- **higher surface area of the membrane**.

Active Transport

Active transport moves substances from a more **dilute** solution to a more **concentrated** solution (against the **concentration gradient**).

This requires **energy** from **respiration**.

Active transport allows **mineral ions** to be absorbed into plant root hairs from very **dilute** solutions in the soil.

It also allows sugar molecules to be absorbed from **lower** concentrations in the gut into the blood which has a **higher** sugar concentration.

Sugar molecules are used for cell **respiration**.

Required Practical—Microscopes

Label the diagram

What is the magnification of the microscope? **x400**

Complete the equation,

magnification = **size of image / size of object**

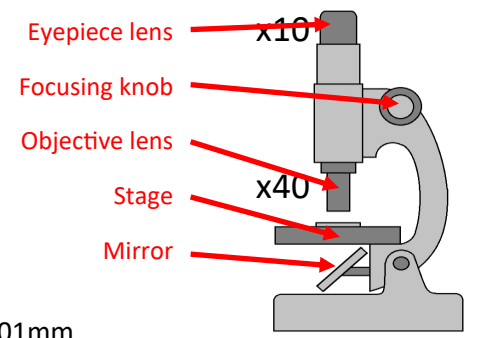
Calculate the magnification of the arrow

40mm/0.01mm = x 4000 (assuming printed full size)

Put these numbers in standard form 7,600,000,000µm **7.6 x 10³m** 0.0000000045m **4.5 x 10⁻⁹m**

An electron microscope has higher **magnification** and **resolving power** than a light microscope.

Why should you move the lens away from the slide to focus rather than towards? **So you don't break the slide or scratch the lens**

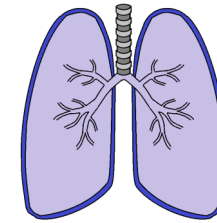


0.01mm

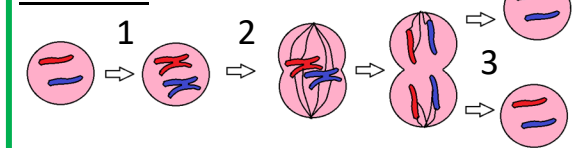
Diffusion Rate

Name 4 adaptations to increase the rate of gas diffusion in the lungs

- **large surface area**
- **efficient blood supply**
- **being ventilated**
- **a membrane that is thin, to provide a short diffusion path**



Mitosis



What happens to each of the following at the numbered stages?

Stage 1 - Ribosomes and Mitochondria - **increase in number ready for division**

Stage 1 - The DNA - **replicates to form two copies of each chromosome**.

Stage 2 - Chromosomes and Nucleus - **1 of each chromosome is pulled to each end of the cell and the nucleus divides**.

Stage 3 - Cytoplasm and Cell Membrane - **divide to form two identical cells**.

Osmosis Experiment

Water may move across cell membranes via **osmosis**. **Osmosis** is the diffusion of water from a **dilute** solution to a **concentrated** solution through a **partially permeable** membrane.

Why did tube A potato gain mass?

Water entered potato by osmosis, (salt solution more dilute than potato)

Why did tube C potato lose mass? **Water left potato by osmosis, (salt solution more concentrated than potato)**

What is the % change if the potato changed from 84g to 90g?

6/84 x 100 = +7.14%

Estimate the concentration of solutions inside the potato **0.41M—0.49M**

