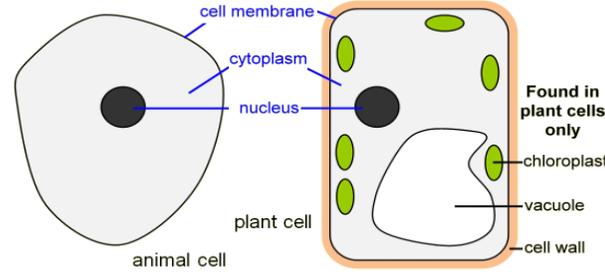
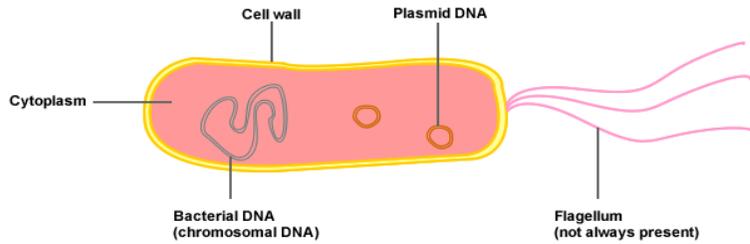
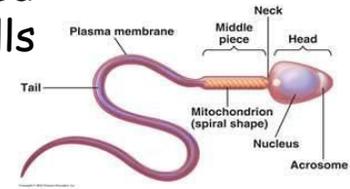


Animal V Plant Cell (Eukaryotic cells)



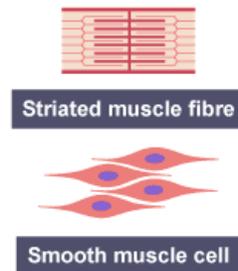
Specialised animal cells



How is a sperm cell specialised?

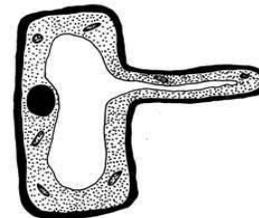
- The tail helps the sperm to move to the egg.
- Lots of energy is stored in the middle section of the sperm cell.
- The head is designed to penetrate into the egg cell.

How is a muscle cell specialised?



- Striated have long protein fibres to stretch and lots of mitochondria for energy
- Smooth muscles have short fibres and lots of mitochondria for energy

Specialised plant cells

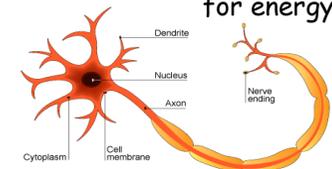


How is a root hair cell specialised?

- They have a thin cell wall so water can be easily absorbed into the cell.
- They have a big surface area so as much water as possible is absorbed.

How is a nerve cell specialised?

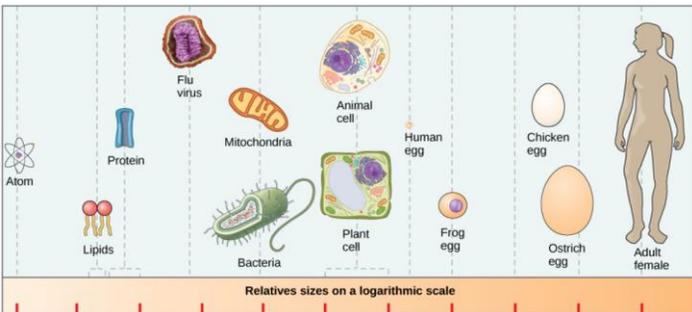
- They are long and thin so messages can be carried all over the body.
- They are specialised to carry electrical signals.
- They have connections at each end.



Bacterial cell (Prokaryotic) consists of; circular DNA, cell wall, cytoplasm, plasmids and flagellum. They are MUCH SMALLER than eukaryotic cells.

Key words:

1. **Cell wall:** support and structure, stops the cell bursting
2. **Cell membrane:** lets substances in and out of the cell
3. **Cytoplasm:** cell chemical reactions take place
4. **Nucleus:** Contains genetic information and controls the cell
5. **Chloroplast:** Absorbs sunlight for photosynthesis
6. **Permanent vacuole:** Stores cell sap
7. **Cell specialisation:** A cell that has features that allow it to carry out its function
8. **Microscope:** Used to enlarge very small objects
9. **Magnification:** How many times larger an object is compared to its actual size
10. **Diffusion:** Movement from a high concentration to a low concentration



Xylem

Phloem

How are the xylem cells specialised?

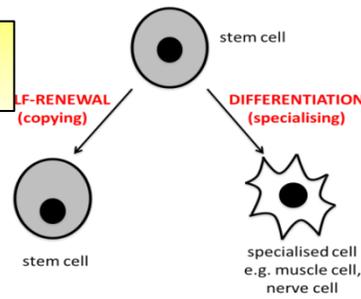
- They transport water and have vessels made of a thick cell wall.
- The cells are dead and hollow.

How are the phloem cells specialised?

- They transport sugar and are not completely hollow.
- The cells are alive.

• A stem cell is an undifferentiated cell that can divide to produce lots more undifferentiated cells.

- Stem cells from human embryos can be cloned and made to differentiate into most different types of human cells.
- Stem cells from adult bone marrow can form many types of cells including blood cells.
- Meristem tissue in plants can differentiate into any type of plant cell, throughout the life of the plant.



Adult stem cells can be used to cure disease. Stem cells can be removed from a healthy person and transferred to someone with faulty cells. Stem cells can be used from embryos to replace faulty cells.

Cell differentiation is when a cell changes to become specialised for its job. Cells develop different structures and turn into different cells which allows them to carry out specific functions (jobs). These can then go on to make tissues and organs

• In animals cells start to differentiate as they develop. In most animal cells the ability to differentiate is lost at very early stage not long after fertilisation. However, lots of plants cells don't lose this ability.

Stem cells and differentiation

Growth & DNA Replication

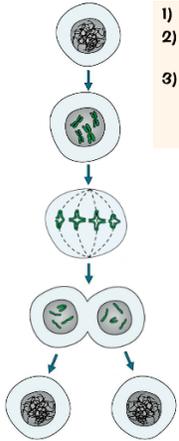
- 1) In a cell that's not dividing, the DNA is all spread out in **long strings**.
- 2) Before it divides, the cell has to **grow** and **increase** the amount of **subcellular structures** such as **mitochondria** and **ribosomes**.
- 3) It then **duplicates** its DNA — so there's one copy for each new cell. The DNA is copied and forms **X-shaped chromosomes**. Each 'arm' of the chromosome is an **exact duplicate** of the other.

The left arm has the same DNA as the right arm of the chromosome.

Mitosis

Once its contents and DNA have been copied, the cell is ready for **mitosis**...

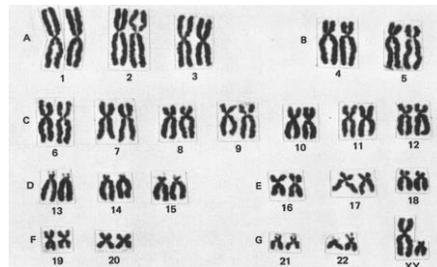
- 4) The chromosomes **line up** at the centre of the cell and **cell fibres** pull them apart. The **two arms** of each chromosome go to **opposite ends** of the cell.
- 5) **Membranes** form around each of the sets of chromosomes. These become the **nuclei** of the two new cells — the **nucleus** has **divided**.
- 6) Lastly, the **cytoplasm** and **cell membrane** divide. The cell has now produced **two new daughter cells**. The daughter cells contain exactly the **same DNA** — they're **identical**. Their DNA is also **identical** to the **parent cell**.



Mitosis is important for growth, repairing and replacing cells.

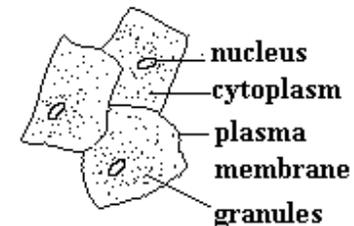
Most cells in the body contain a nucleus and in the nucleus are chromosomes which are coiled up lengths of DNA. Body cells have two copies of each chromosome one from each parent. Humans have 23 pairs of chromosomes.

Cell division



Electron microscopes use electrons instead of light to form an image. They have a higher **magnification** and **resolution** (a sharper image).

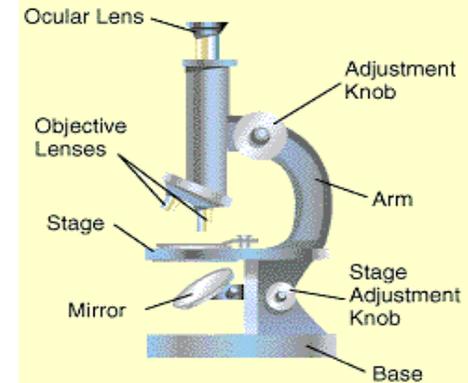
DRAWING CELLS
Draw the cells with a pencil
Make sure it has clear unbroken lines with no shading or colouring.



Magnification = image size/real size

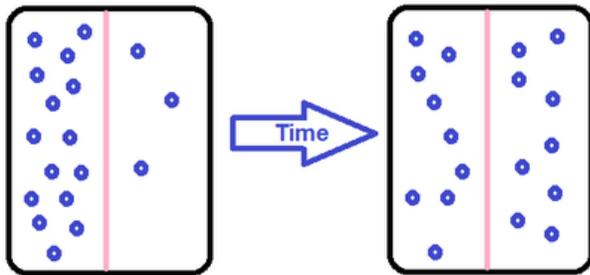
MICROSCOPES

1. Prepare a thin sample to allow light to get through and stain cells
2. Place a cover slip over the top
3. Place slide on stage
4. Put objective lens on lowest magnification
5. Look down ocular lens
6. Use adjustment knob to focus



Diffusion

1. Substances move from a high concentration to a low concentration
2. Down the concentration gradient
3. The higher the temperature the quicker the molecules move so the faster the rate of diffusion



The rate of diffusion can be affected by:
The difference in concentration
The temperature
The surface area of the membrane.

Key words:

Cell: Building blocks of life.

Tissue: Group of similar cells working together.

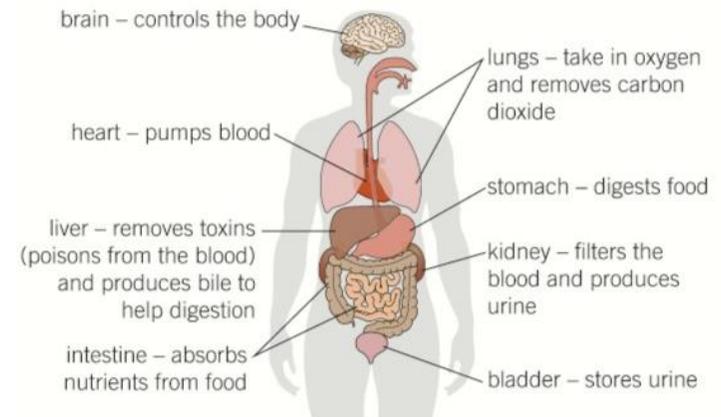
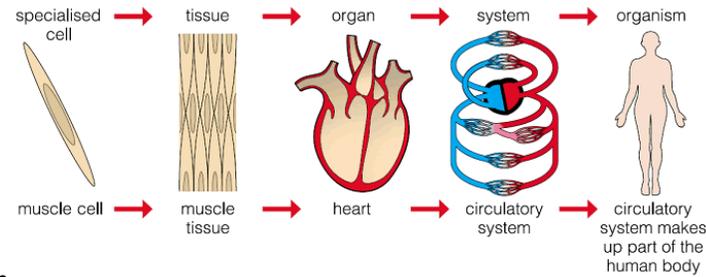
Organ: Group of similar tissues working together.

Organ system: Group of organs working together.

Multicellular: Many types of cells or more than one cell.

Organism: A living thing, e.g. an animal or plant.

Organisation in animals.



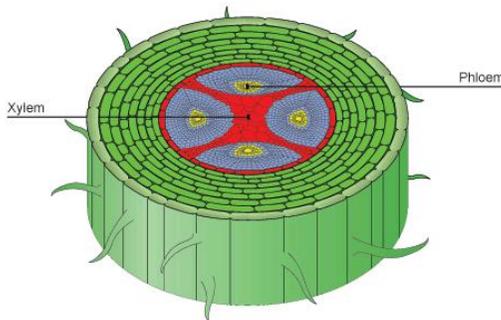
Organisation in plants.

Tissue Function

Epidermal tissue: Covers the plant

Mesophyll: Carries out *photosynthesis*

Xylem and phloem: Transport of substances around the plant



Revision questions

1. Compare a eukaryotic and prokaryotic cell in terms of their structure.
2. Describe how a sperm cell and a muscle cell are specialised to carry out their function.
3. Describe how a root hair cell and a xylem cell are adapted to carry out their function.
4. How does the size of a bacterial relates to an animal cell?
5. What is cell differentiation?
6. How do cells differentiate?
7. Describe how you make a slide.
8. What are the differences between a light microscope and an electron microscope?
9. Draw some animal cells and label them.
10. How many chromosomes does a human have, what are they made of and where are they found?
11. Produce a flow diagram of the stages of mitosis.
12. Define a stem cell.
13. What do embryo stem cells have the potential to do?
14. Describe how adult stem cells and plant meristems.
15. Where does diffusion occur?
16. How could you increase the rate of diffusion?
17. Give an example of a cell, a tissue and an organ found in the human digestive system.
18. Give three tissues found in a plant.