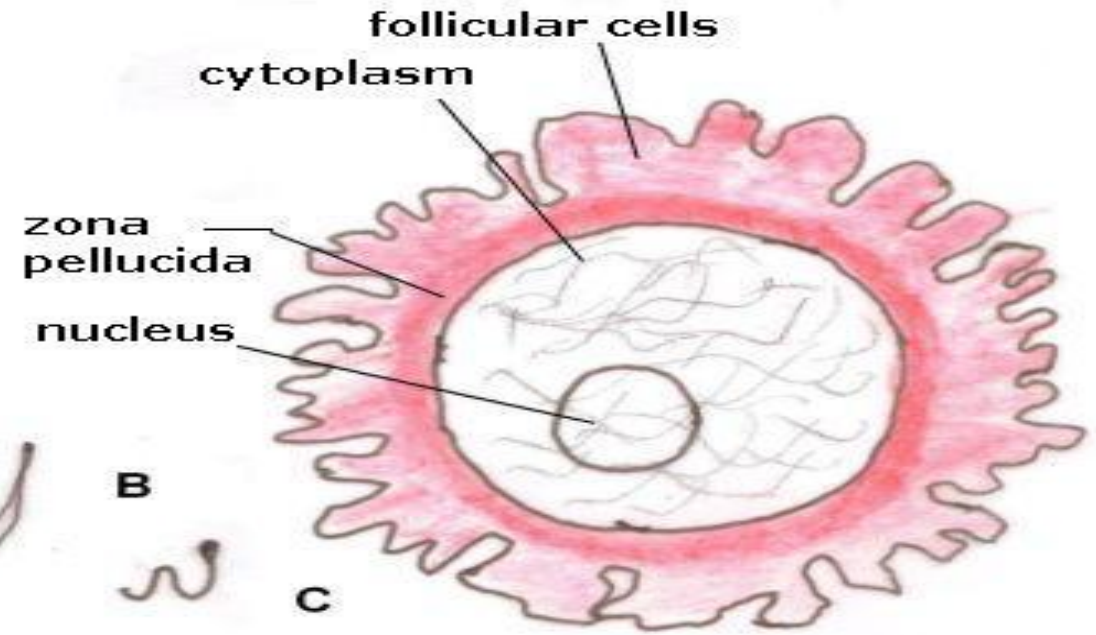
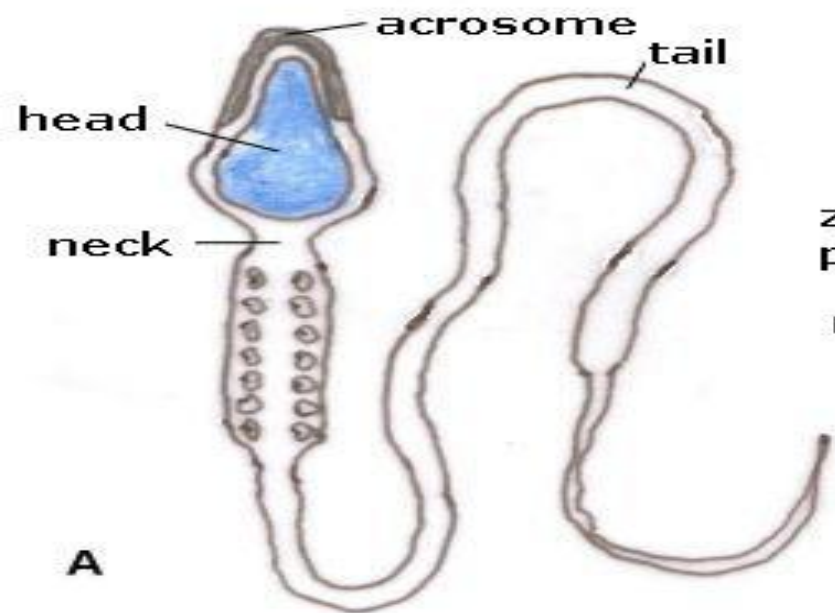
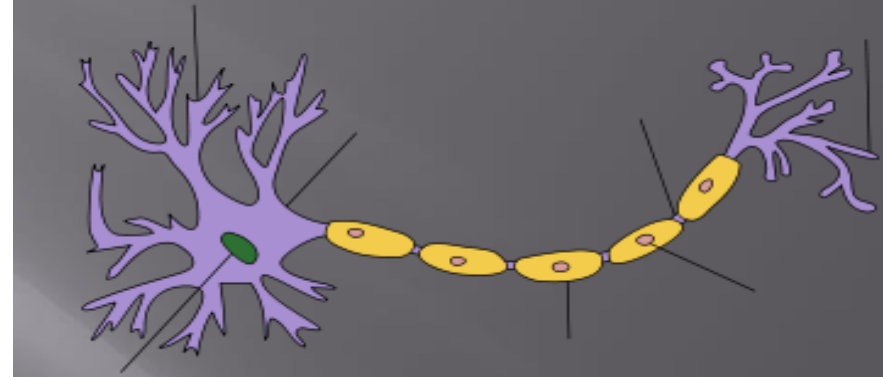
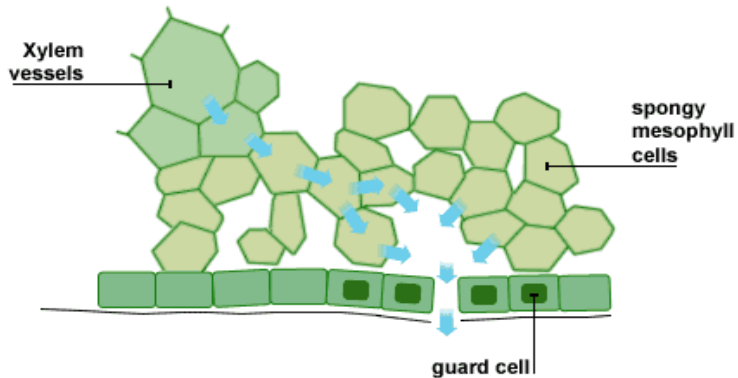


# Cells as the basic units of life



# Cells are living things

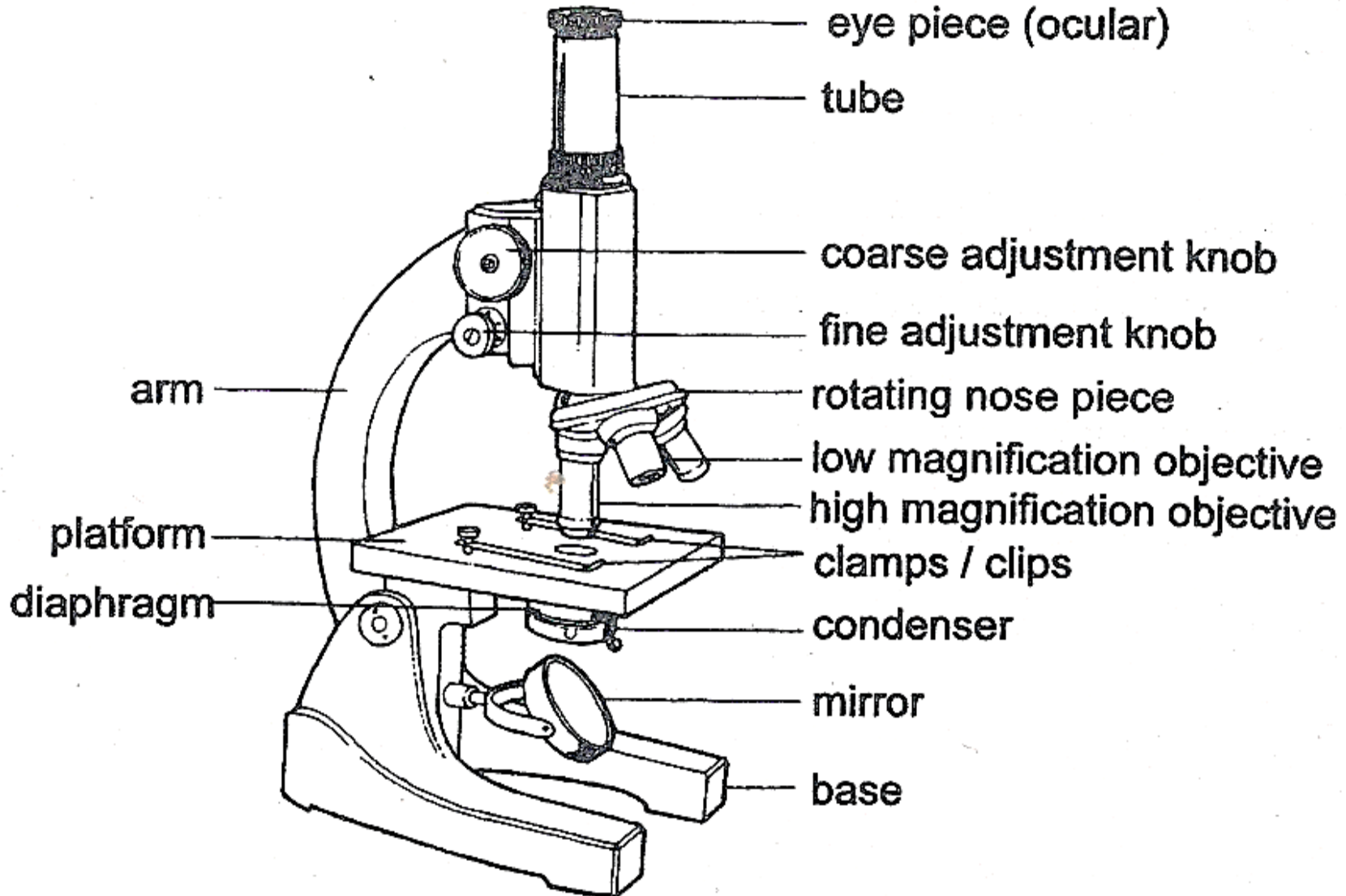
All living things have the following life processes:

1. **Feeding** – living things need food. Green plants make their own food during photosynthesis. Animals get their food by eating other organisms.
2. **Respiration** – process of gaseous exchange.
3. **Excretion** – living things produce waste products (such as carbon dioxide) which they need to get rid of.
4. **Growth** – living things grow and get bigger.
5. **Movement** – animals tend to move quite fast so we see this happening. Plants move very slow.
6. **Reproduction** – living things produce new individuals that are the same to themselves.
7. **Sensitivity** – living things react to the environment.

# Cell structure

- ▣ The cell is the basic structural and functional unit of all living organisms. Cells can be seen under a microscope (they are microscopic).
- ▣ Plant and animal cells have a cell membrane, cytoplasm, nucleus, and organelles such as mitochondria, vacuoles and chloroplasts.
- ▣ The *cell membrane* encloses the contents of the cell. It allows specific substances to pass into and out of the cell
- ▣ The *cytoplasm* is the jelly-like medium in which many chemical reactions take place.
- ▣ The *nucleus* contains DNA.
- ▣ The nucleus is enclosed by a *nuclear membrane* (in plants and animals).
- ▣ DNA contains inherited characteristics, such as whether eyes are blue or brown.
- ▣ DNA is unique to each person; this *variation* accounts for differences within species.
- ▣ *Mitochondria* are responsible for respiration to release energy from food

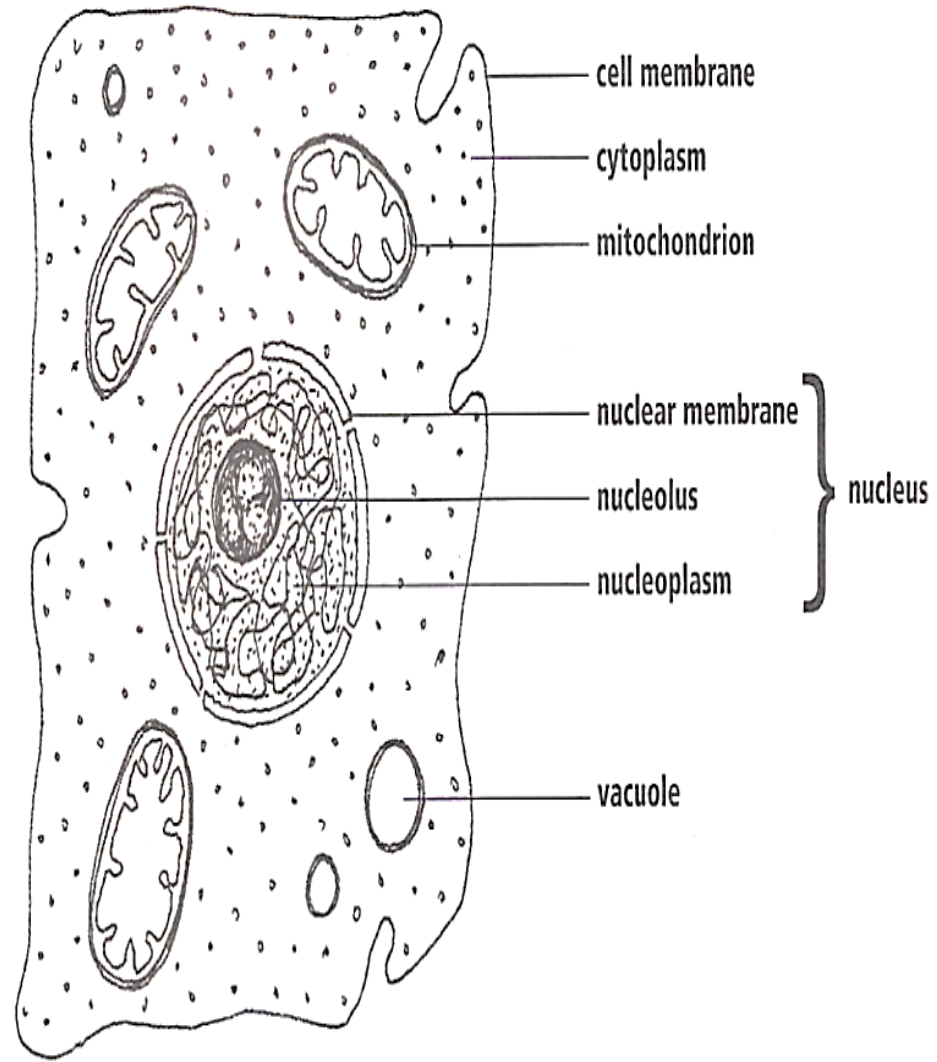
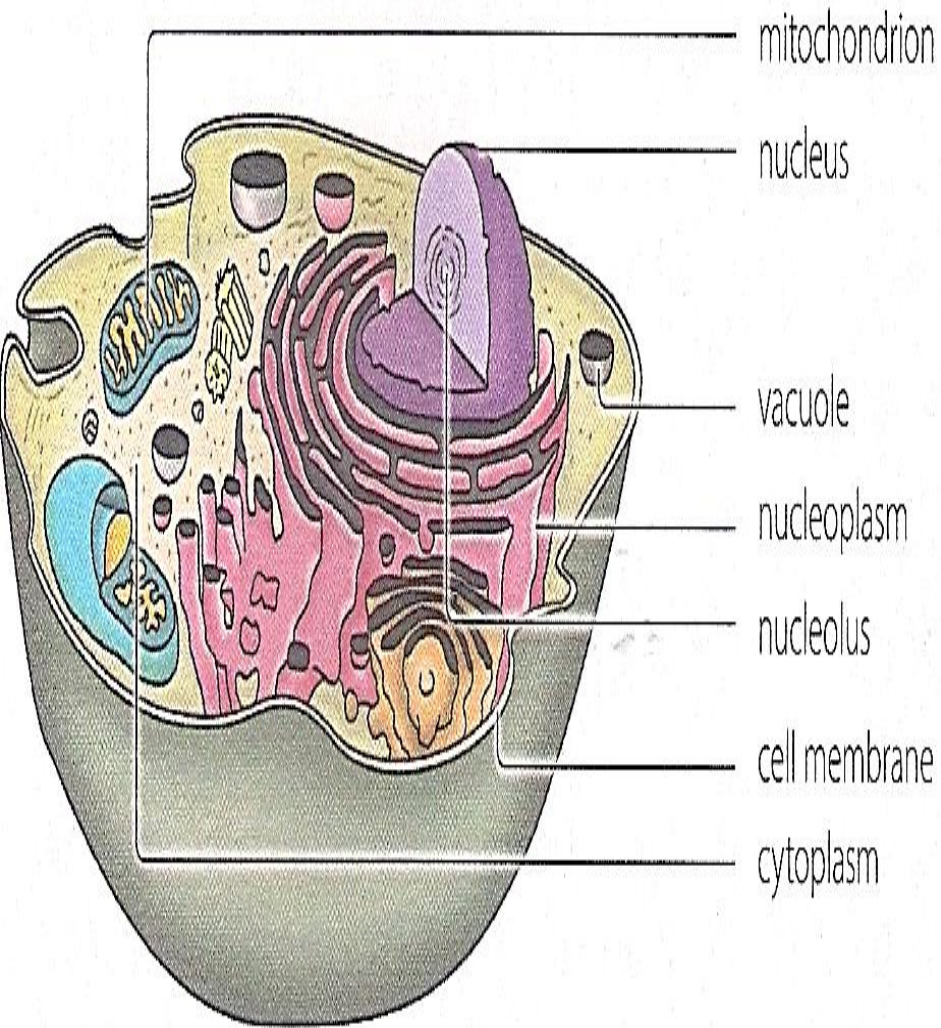
# Microscope



*The (compound) light microscope*

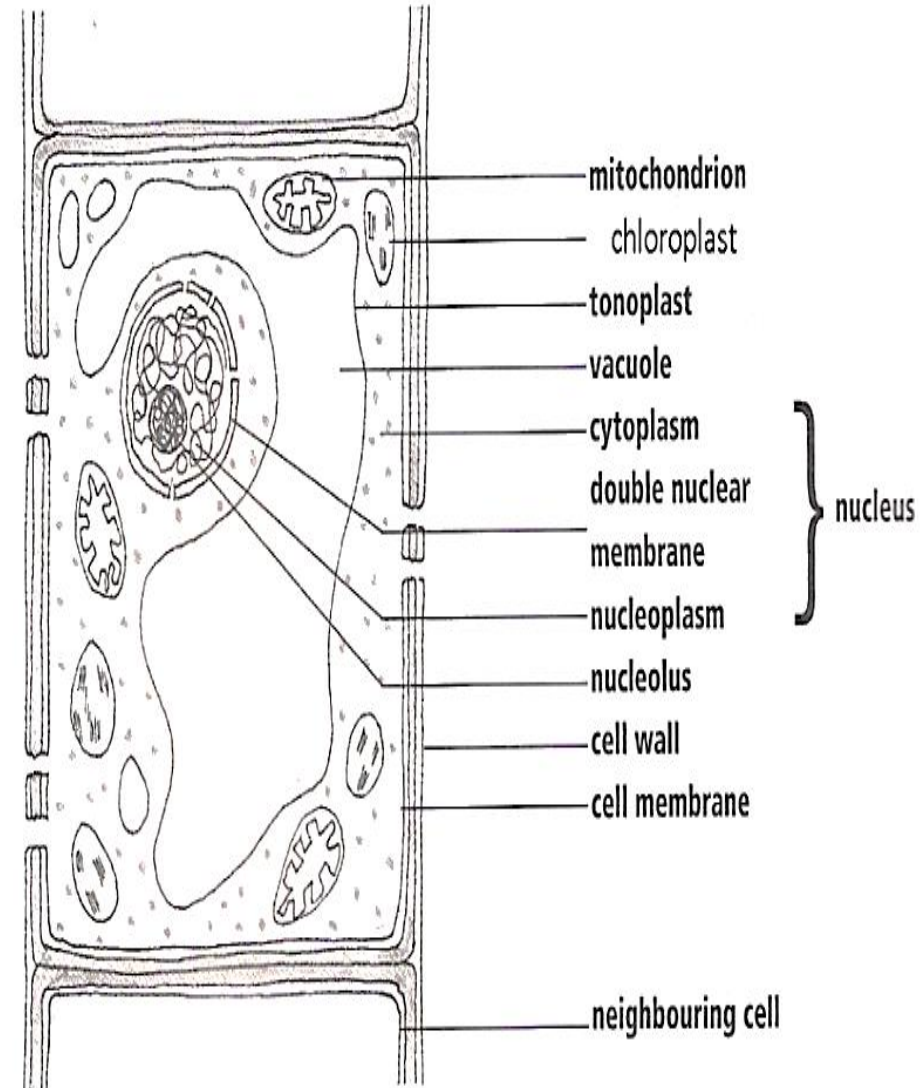
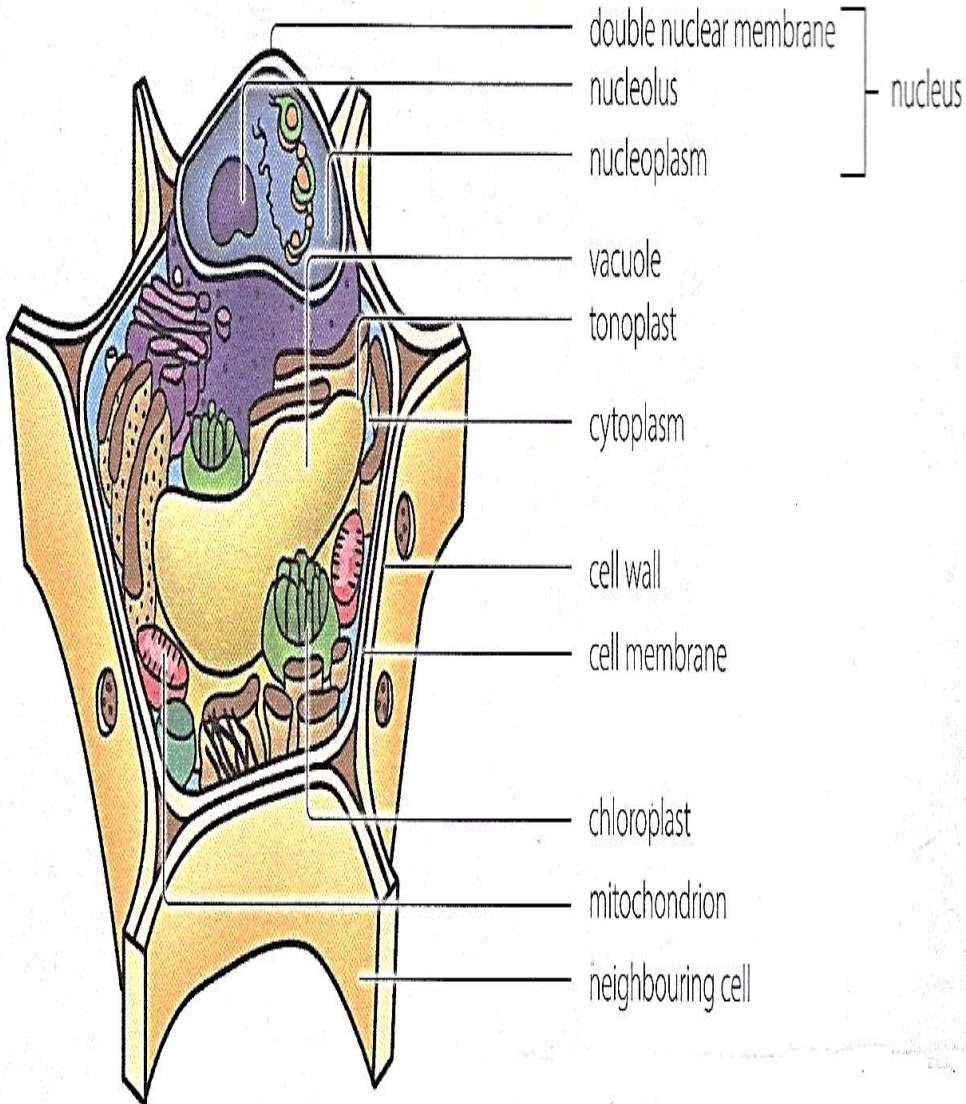


# Animal cell



*Generalised structure of an animal cell]*

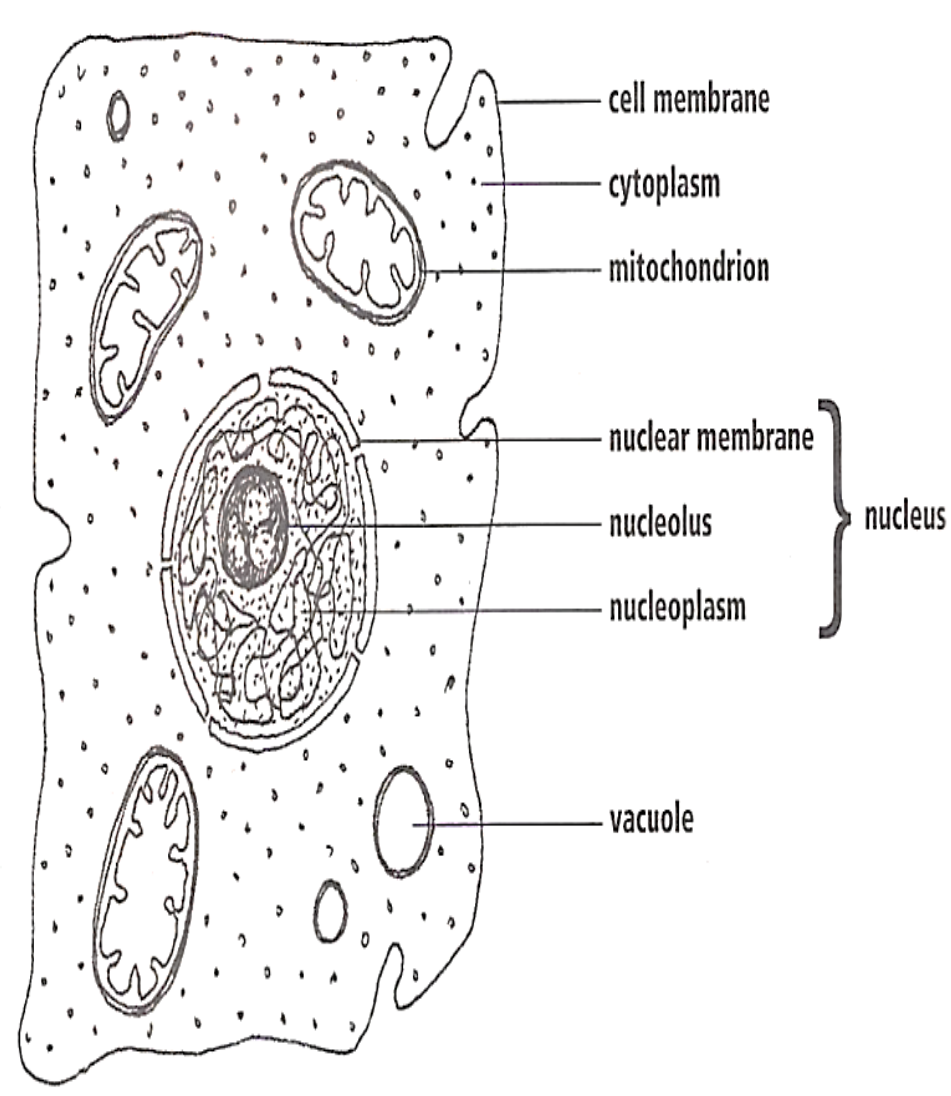
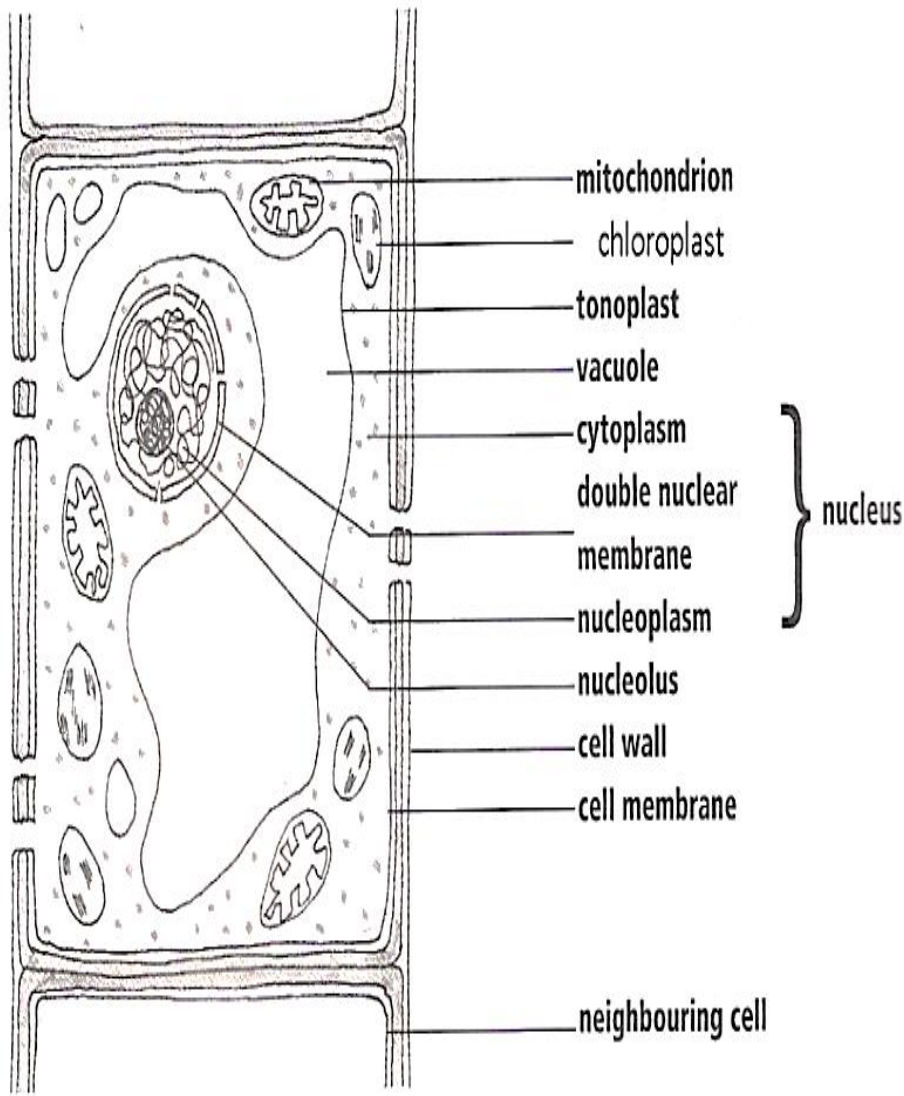
# Plant cell



*Generalised structure of plant cell*



# Difference between plant and animal cell



Generalised structure of plant cell

Generalised structure of an animal cell]

# Summary

- ▣ Plant cells differ from animal cells.
- ▣ Plant and animal cells are enclosed by a cell membrane, and plant cells also have rigid cellulose *cell walls* to provide support for the plant.
- ▣ Plant cells also contain organelles such as large vacuoles and chloroplasts. *Chloroplasts* contain chlorophyll to absorb light energy for photosynthesis.
- ▣ Vacuoles in plant cells have several functions including support and storage (Vacuoles in animal cells are small and temporary or absent).








# Summary

| Characteristics | Plant cell  | Animal cell   |
|-----------------|---|---|
| Cell shape      | Rigid and fixed shape due to the presence of a cell wall. | Flexible or changeable shape due to the absence of cell wall. |
| Cell wall       | Sturdy cell wall present.                                 | No cell wall.   |
| Vacuole         | Has one or two large permanent vacuoles.                  | Usually no vacuole or many small one.                         |
| Chloroplast     | Found in cytoplasm of certain cells (green leaves)        | No chloroplast.   |

# Cells in tissues, organs and systems

- ▣ Cells come in many different shapes and sizes.
- ▣ Cells are adapted to perform specific functions, such as muscle cells which are specialised to contract and enable movement.
- ▣ Microscopic organisms such as bacteria, consist of a single cell. Macroscopic organisms such as humans, consist of large numbers of cells.
- ▣ A group of cells performing a specific function form a tissue.
- ▣ A group of tissues make up an organ, and organs working together in groups form systems, systems make up an organism.
- ▣ Stem cells are cells that have the ability to divide and develop into many different cell types.

# Level of organisation

| Level of Organization   | Explanation   | Example                              |
|---|---|--------------------------------------|
| <br>Cellular Level       | Cells are the smallest unit of life. Cells are enclosed by a membrane or cell wall and in multicellular organisms often perform specific functions. | Muscle cell, Skin cell, Neuron       |
| <br>Tissue Level         | Tissues are groups of cells with similar functions  | Muscle, Epithelial, Connective       |
| <br>Organ Level          | Organs are two or more types of tissues that work together to complete a specific task.   | Heart, Liver, Stomach                |
| <br>Organ System Level | An organ system is group of organs that carries out more generalized set of functions.  | Digestive System, Circulatory System |
| <br>Organismal Level   | An organism has several organ systems that function together.   | Human                                |