

Grade 8 Science  
Chapter 10 – Characteristics of Life and Cells

All living things share certain characteristics. All living things:

- Grow
- Move (even plants will slowly turn to face the sun)
- Respond to stimuli
- Reproduce

### **The Cell Theory**

One of the key ideas of biology, the cell theory includes three important facts about cells and their connection with living things that were agreed upon by scientists studying cells using microscopes:

- The cell is the basic unit of life
- All living things are made up of one or more cells
- All cells come from other living cells.

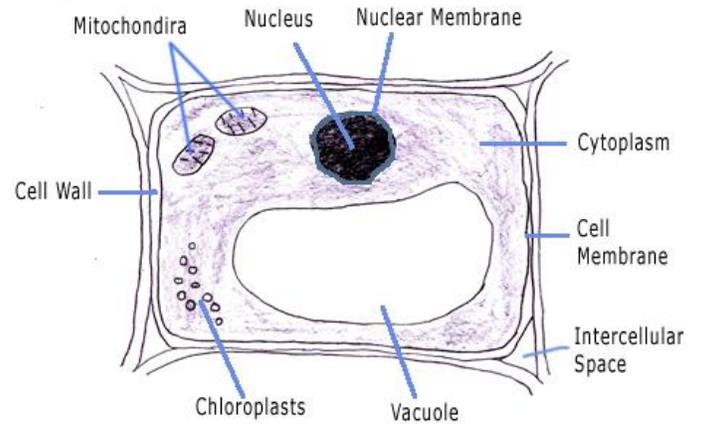
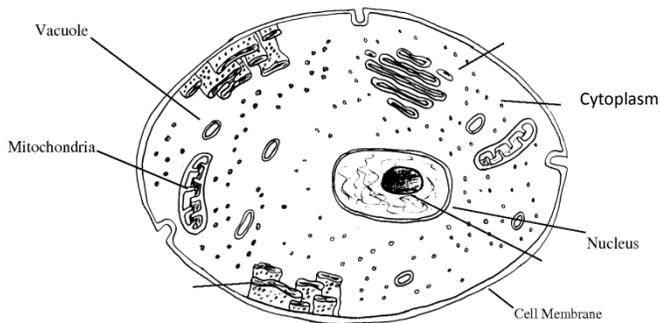
### **Focussing on Cells**

The cell is the smallest, most basic functional system of any living thing.

The structures of a cell that perform a specific function are called organelles. Some of the common organelles of animal and plant cells include:

- Cell membrane – surrounds and protects the cell, and selectively controls the movement of foods, wastes, etc in/out of the cell
- Cell wall – only in plant cells, tough and rigid structure that surrounds the membrane and gives plant cells their box-like shape
- Cytoplasm – jelly-like fluid that organelles float in which helps distribute food and oxygen around the cell
- Nucleus – large, round, control centre of the cell containing chromosomes (the master instructions for cell activities)

- Vacuole – balloon-like space in the cytoplasm which stores extra food, wastes, water, etc. and are smaller and more numerous in animal cells
- Mitochondria – oval, bean shaped structures that break down food particles to produce energy for the cell
- Chloroplast – green structures found only in plant cells that capture energy from the Sun and produce food using photosynthesis



Animal Cell

Plant Cell

An animal cell differs in the following ways:

- It does NOT have a cell wall and therefore would NOT be rectangular in shape
- It does NOT have chloroplasts
- It has many small vacuoles instead of large one(s).

## Dividing Cells

All cells divide at some point in their life cycle. When cells divide, one cell becomes two cells.

*Unicellular* organisms such as bacteria divide like this to produce more of their kind.

Most cells in *multicellular* organisms divide in order to replace other cells that are dead, dying or in need of repair

**Mitosis** is the process of cell division where the genetic material (the chromosomes) duplicates and then divides into two identical sets of chromosomes.