

# Life Processes and Living Things

## Life processes and cell activity

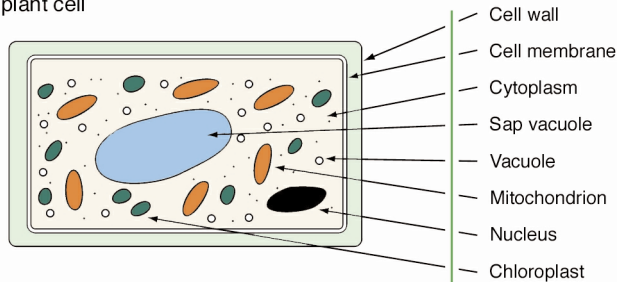
Plants and animals are living things. As living things they show or are capable of showing the following life processes:

M	Movement
E	Excretion
R	Respiration
R	Reproduction
I	Irritability
N	Nutrition
G	Growth

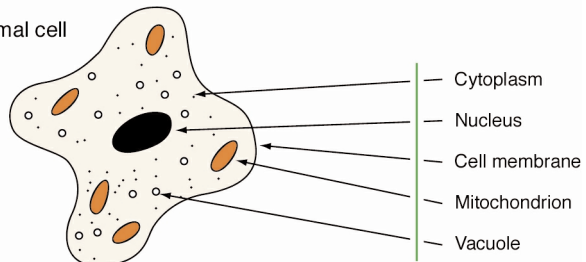
## Cells

All living material is built of cells. Cells have complicated internal structures and carry out all the chemical reactions which drive the processes of life.

General plant cell



General animal cell



Note: The plural of mitochondrion is mitochondria

## How substances enter and leave the cell

Most cells are bathed in an aqueous (water-based) solution, and gases and some other dissolved substances drift in and out of them by the process of **diffusion**.

The three ways that substances move in and out of cells are

Diffusion is

This means that substances move

Diffusion occurs in respiration

Osmosis is

Osmosis occurs in cells because

This means that

Active transport is

This requires

diffusion, osmosis and active transport.

the random spreading out of substances which distributes them evenly.

from high concentrations to lower ones.

when oxygen and carbon dioxide move in and out of cells.

the diffusion of **water** from a less concentrated (more dilute) solution to a more concentrated one.

the cell membrane is **selectively- or partially-permeable**.

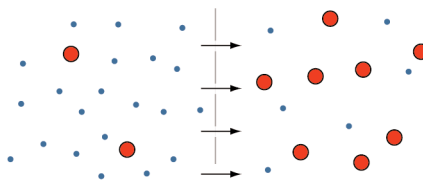
some molecules are too large to pass through it.

the movement of substances from a region of low concentration to one of high concentration (the opposite of osmosis and diffusion).

energy from the cell.

Osmosis

Selectively-permeable membrane



Water molecules • move through the selectively-permeable membrane to equalise the concentration of the larger molecules ○ on both sides

**Active transport** occurs, for example, in plants when some materials move up the phloem and others move down it and in the contractile vacuole of the amoeba which fills with water even though its contents are more dilute than the cell's cytoplasm.

Some other stimuli which plants may react to are: water, touch and certain chemicals.

### Commercial applications of hormones

These include:

the use of rooting hormones on cuttings to promote root growth

killing weeds by disrupting their normal growth pattern

stimulating fruit growth.

### Questions

- 1 What is a tropism?
- 2 How do tropisms benefit plants? Give examples.

## Variation, inheritance and evolution

### Variation

Variation is the differences between individual organisms of the same species. It may arise from genetic or environmental causes, such as good or poor diet.

### Inheritance

Parents pass certain characteristics on to their children. Children are said to inherit these characteristics. For example, these may include the shape of their ears or nose but not scars or knowledge of science.

### Evolution

Organisms live where they are best able to survive. Over time, this has led to the most successfully adapted organism being the survivor. Gradual changes can, over time, lead to new species being produced – evolution (see page 51).

### Grouping organisms

#### Animals

Animals can be divided into

vertebrates and invertebrates.

Vertebrates have

backbones.

Vertebrates can be grouped as

fish, reptiles, amphibians, birds, mammals.

### Type of bonding

Ionic compounds have

Examples

Metals have

Examples

Covalent compounds have

Examples

Examples

### Structure

giant structures with high melting temperatures.

sodium chloride, calcium oxide.

giant structures with high melting temperatures.

copper, iron.

either giant structures with high melting temperatures

carbon as diamond, silicon dioxide (sand)

or molecular structures with low melting temperatures

carbon monoxide, ethanol.

### Bonding and conductivity

Bonding affects the way different substances conduct electricity.

Remember that there must be charged particles present that may move to carry the current if a substance is to conduct electricity. Ions (in ionic compounds) are charged particles and metal structures have a pool of electrons – also charged particles.

Covalently bonded substances

Metals

Ionically bonded compounds do conduct

Ionically bonded compounds do not conduct

never conduct.

always conduct.

when they are dissolved in water or when they are melted, because the ions are free to move.

when solid.

