Learning List

1. Eukaryotic cells (plant and animal cells) have a cell membrane, cytoplasm and genetic material enclosed in a nucleus.
2. Prokaryotic cells contain cytoplasm, cell membrane and a cell wall. The genetic material is not in a nucleus but a single loop.
3. Prokaryotic cells can contain plasmids.
4. Prokaryotic cells are much smaller than eukaryotic cells.
5. Animal cells contain nucleus, cytoplasm, cell membrane, mitochondria and ribosomes.
6. Plant cells also contain chloroplasts, a vacuole and a cell wall.
7. Plant cell walls are made of cellulose.
8. Most animal cells differentiate at an early stage (become specialised)
9. Most plant cells retain the ability to differentiate throughout their life.
10. Cells can be specialised to carry out a particular function e.g. sperm cells, nerve cells, muscle cells, root hair cells, xylem and phloem cells.

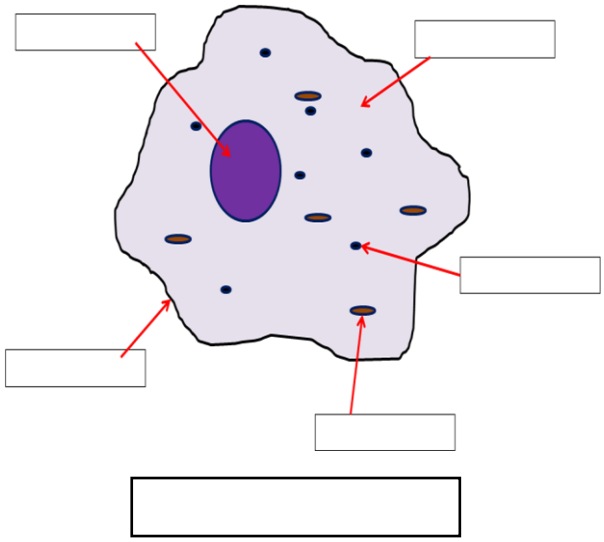
Cells

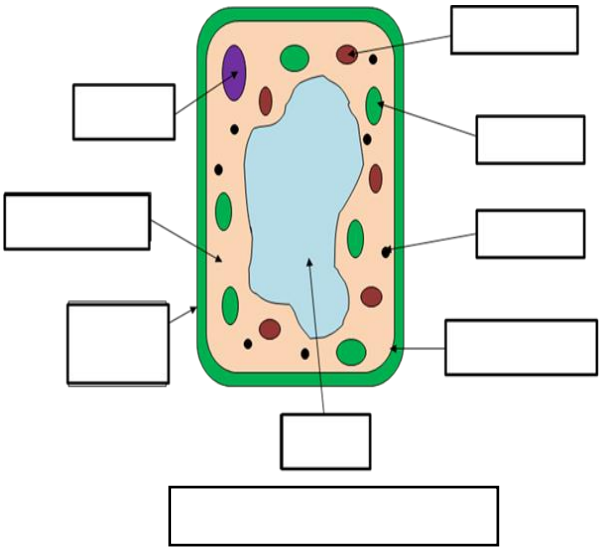
All living things are made of _____.

Cells can either be _____ or _____.

Plants and animal cells are _____.

Label the diagram of a plant and animal cell.

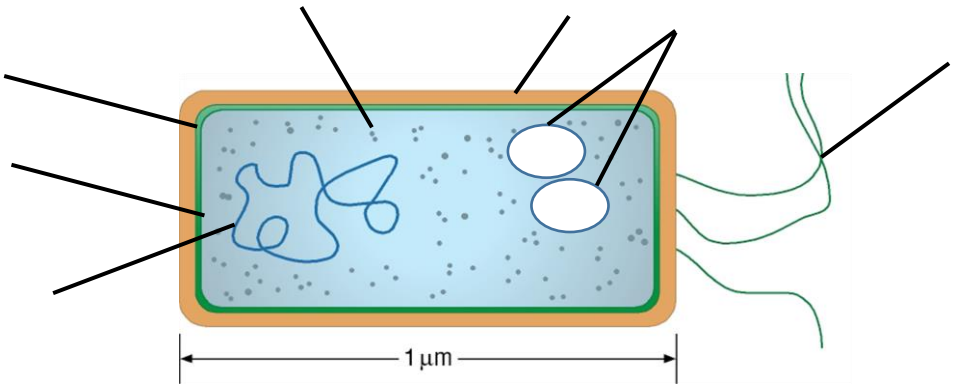




Compare the structure of a plant and animal cell

Bacteria are _____ cells.

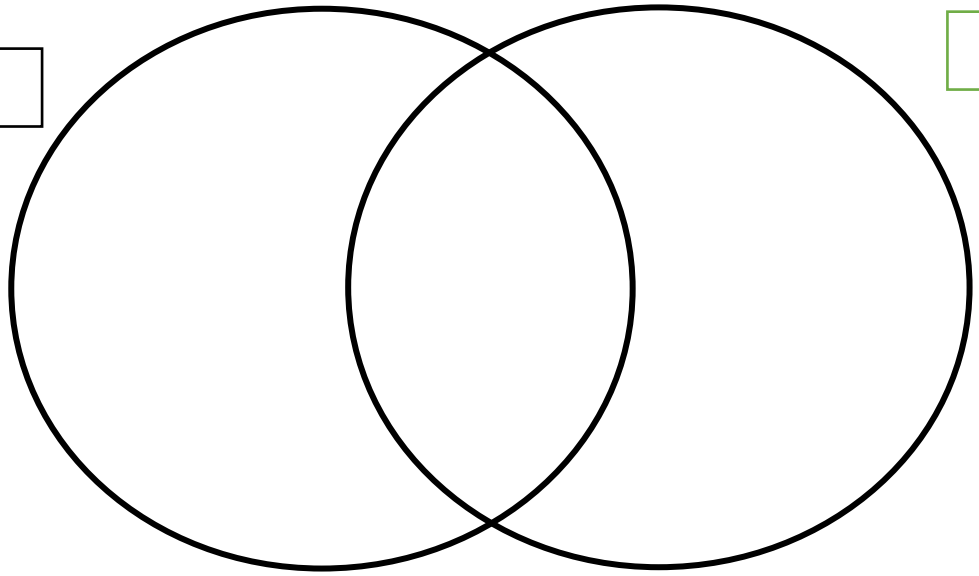
Label the diagram of a bacterial cell.



Complete the Venn Diagram to compare eukaryotic and prokaryotic cells

Prokaryotic

Eukaryotic



Function of cell organelles

Feature		Function
Nucleus		All the proteins needed for the cell are synthesised (made) here
Permanent Vacuole		Chemical reactions needed for life occur in this liquid gel.
Mitochondria		Controls the movement of substances in to and out of the cell.
Cell Wall		This is where oxygen is used and most of the energy is released during respiration.
Cytoplasm		Large space containing cell sap. Helps to keep cells rigid to support the plant.
Cell membrane		Contains chlorophyll, a green substance that absorbs light energy to make food by photosynthesis.
Chloroplast		Made of cellulose & forms a rigid non-living box around the cell to strengthen & provide support.
Ribosomes		Controls all activities of the cell. Contains the genes on chromosomes.

Learning List – Microscopes

1. Light microscopes use light and lenses to form an image of a specimen.
2. Light microscopes are used to se nuclei, chloroplasts, cell wall, cell membrane and mitochondria. Electron microscopes use electrons to form an image.
3. Stains are used to make the specimen visible.
4. Electron microscopes have a higher magnification.
5. Electron microscopes has a higher resolution (able to distinguish between 2 points, gives a sharper image).
6. Electron microscopes allow us to see ribosomes and plasmids.
7. The specimen has to be dead when using an electron microscope.
8. Magnification = Image Size ÷ Actual size
9. 1000µm = 1mm
10. We can use standard form to represent the size of a specimen eg 0.025 = 2.5×10^{-2} mm

Microscopes

Put these things into size order, starting with the largest:

Ribosome

Chloroplast

Nucleus

Mitochondria

Eukaryotic cell

Plasmid

Prokaryotic cell

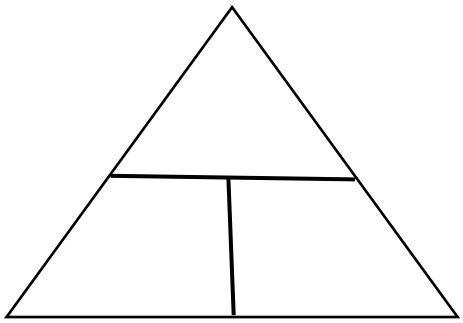
Identify the organelles which can be seen with a light microscope.

Identify the organelles which can only be seen with an electron microscope

Explain why an electron microscope is needed to see these organelles.

Magnification

$$\text{Magnification} = \frac{\text{Image size}}{\text{Actual size}}$$



1mm = _____ µm

Convert these mm to µm

1. 4 =
2. 8 =
3. 12 =
4. 0.2 =
5. 0.05 =
6. 1.7 =
7. 3.58 =
8. 0.003 =

Convert these µm to mm

1. 7000 =
2. 450 =
3. 20 =
4. 3 =
5. 0.5 =
6. 65 =
7. 400 000 =
8. 12 500 =

1. A specimen is 50 µm wide. Calculate the width of the image of the specimen using a microscope with a magnification of x500. Give your answer in mm.

2. An onion cell is viewed under the microscope. The image of the cell is 7.5mm wide. The magnification of the microscope is x100. Calculate the real size of the cell.

3. Underneath the microscope, a cell appears to be 40mm wide. The actual width of the cell is only 4µm. Calculate the magnification of the microscope.

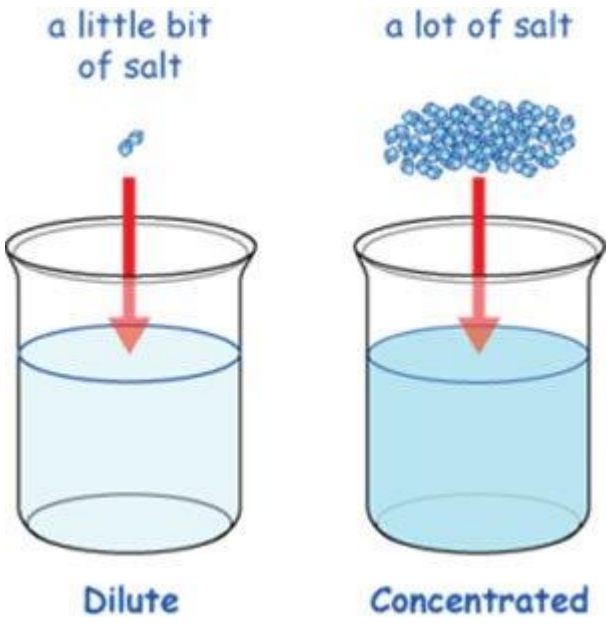
Specialised cells

1. Match the specialised cell with its feature.

Sperm cell	Contain dendrites (extensions) that connect to other cells.
Nerve cell	Has a long tail for movement and many mitochondria to release energy for this.
Muscle cell	Contain proteins that slide over each other making fibres contract and many mitochondria to release energy for this.
Root hair cell	Cell wall broken down to produce sieve plates which allow water carrying dissolved substances such as glucose to move freely up and down. Supported by companion cells which contain mitochondria needed for the movement of substances.
Phloem cell	Hollow tubes containing lignin to allow water to move freely through them. Lignin helps them withstand the pressure of moving water up the stem.
Xylem cell	Contain many chloroplasts which are needed to absorb light energy for photosynthesis.
Palisade (leaf) cell	Has extensions which increase the surface area for the absorption of water. Contain many mitochondria for the uptake of ions by active transport

Learning List – Diffusion, Osmosis and Active Transport

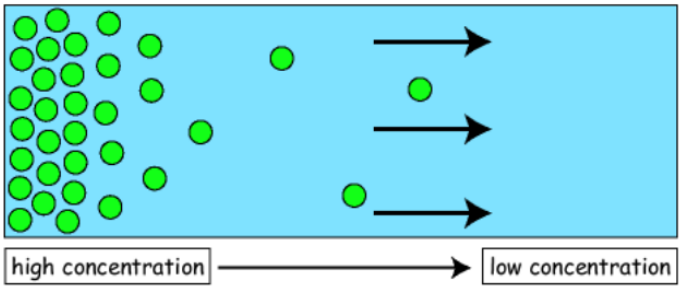
1. Diffusion is the movement of particles from an area of higher concentration to an area of lower concentration.
2. Diffusion happens in liquids and gases.
3. Diffusion does not require energy.
4. The rate of diffusion is affected by the concentration gradient, temperature and surface area of the membrane.
5. Osmosis is the movement of water molecules from an area of higher concentration (dilute solution) to an area of lower concentration (concentrated solution) across a partially permeable membrane.
6. Osmosis does not require energy.
7. Cells that gain water by osmosis get bigger and can burst.
8. Cells that lose water by osmosis get smaller.
9. Active transport is the movement of substances from an area of lower concentration (more dilute solution) to an area of higher concentration (concentrated solution).
10. Active transport required energy from respiration.



Higher concentration of water

Lower concentration of water

Diffusion

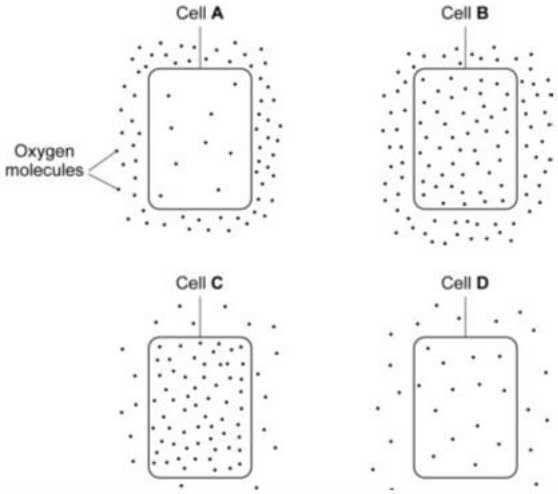


Diffusion is the _____ movement of particles from and area of _____ concentration to an area of _____ concentration.

The factors that affect the rate of diffusion are:	

The diagrams show cells containing and surrounded by oxygen molecules.

Oxygen can move into cells or out of cells.

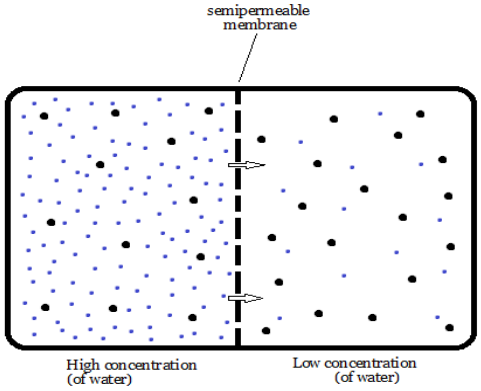


For each cell describe which way the oxygen will move and explain why.

Suggested revision task to complete:

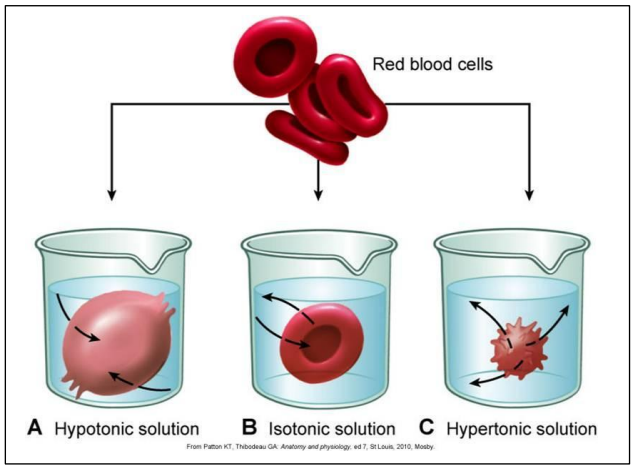
- Create a series of flash cards showing different examples of where diffusion happens. Here are some ideas to get you started:
  - Movement of oxygen from red blood cells into muscle cells
  - Movement of oxygen from alveoli into blood capillaries and the movement of carbon dioxide from the blood capillaries into the alveoli
  - Movement of glucose from the small intestines into the blood capillaries
  - Movement of glucose from the blood capillaries into the muscle cells
  - Movement of carbon dioxide from the air into a leaf through the stomata and the movement of oxygen out of the leaf through the stomata
  - Movement of oxygen from water into the blood capillaries of the gills of a fish

Osmosis



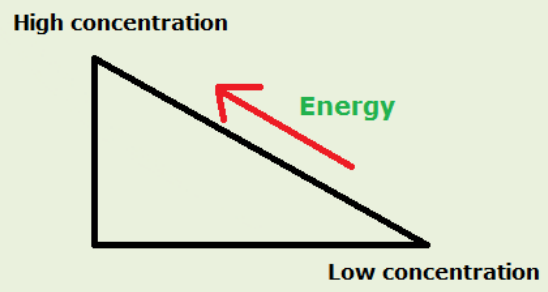
Osmosis is the movement of _____ molecules from a region of _____ water _____ to a region of _____ water potential across a _____ _____ _____.

Describe and explain the results shown below.



Active transport

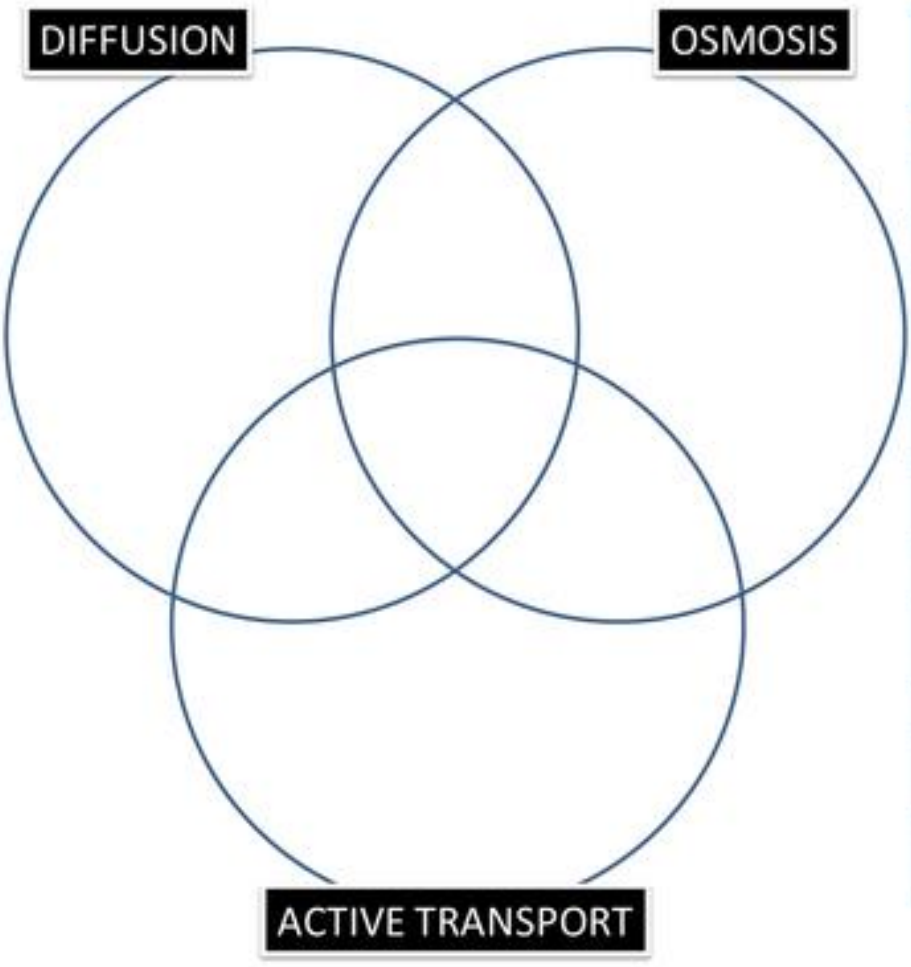
Active transport is the movement of particles _____ a concentration gradient i.e. from an area of _____ concentration to and area of _____ concentration using _____- transferred during _____.



Examples of active transport

- Absorption of mineral ions by root hair cells
- Absorption of glucose in the small intestine (Most soluble food are absorbed by diffusion however when the concentration of glucose in the blood is higher than in the small intestine active transport is used)
- Reabsorption of glucose and ions in the kidney.

Diffusion, Osmosis or Active transport?



Place these features in the correct part of the Venn Diagram
Involves water only
Requires energy
Is passive
Movement of particles
Needs a semi-permeable membrane
High to low concentration
Against a concentration gradient
Occurs in nature
How minerals get into root hair cells
How oxygen leaves a leaf
How water keeps plant cells turgid
Involves transport of solutes