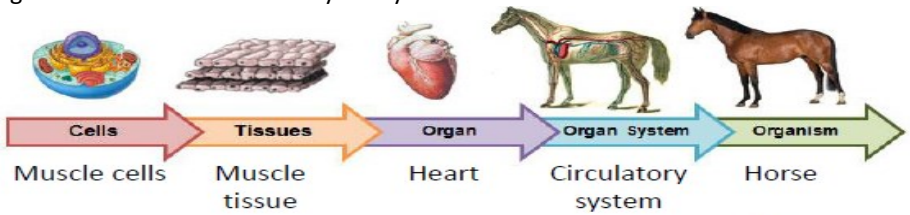
SCIENCE

Year 7: Cells

1) What are cells?

- All living things are made up of cells. Cells are the building blocks that that multicellular organisms are made of and they rarely work alone.



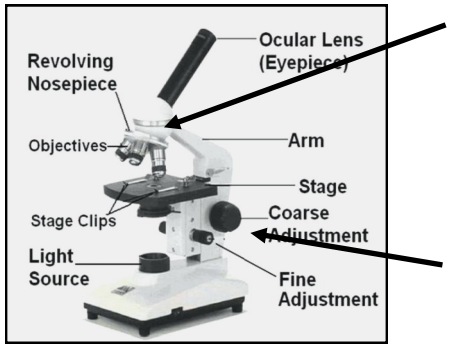
- A human body is made up of around 100 million million cells, many of which work together in groups to do things. The features below are common to all living organisms.

Life Processes		
M	Movement	All living things move, even plants
R	Respiration	A chemical reaction that releases energy in cells
S	Sensitivity	Detecting changes in the surroundings
G	Growth	All living things grow
R	Reproduction	Making more living things of the same type
E	Excretion	Getting rid of waste
N	Nutrition	Taking in and using food

2) How can we see cells ?

<u>Using a microscope</u>

1. Rotate the objective lenses so that the low power e.g. x4 is in line with the stage.
2. Ensure that the objective lens is as close to the stage as possible
3. Place the slide on the stage and move the slide until the object is in the centre of the stage and the image can be seen.

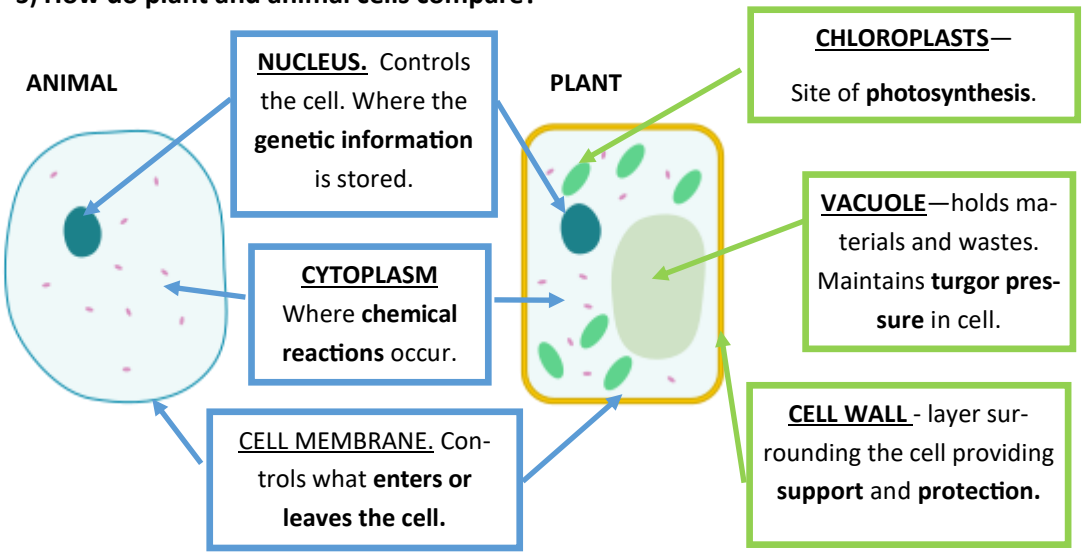


First rotate the lenses so that the smallest x4 lens is in line with the eyepiece. Use this lens to locate the specimen before using the other higher power lenses for greater magnification.

Turn the course focus until the image of the object is as clear as possible. Use the fine focus for more precise adjustment.

Keyword	Meaning	Keyword	Meaning
Communicable disease	A disease that can be spread	**Organism**	Any living thing that can reproduce, grow and respond to its environment
DNA	The name of the chemical that chromosomes and genetic material are made of.	**Pathogen**	A disease causing organism
Microbe	A microorganism or microbe is an organism too small to see with the eye.	**Tissue**	A group of cells that together carry out a particular job
Magnification	Making something look bigger than it actually is	**Turgor pressure**	A force within a plant cell pushing out on the cell wall to support the plant.
Organ	Part of the body that is self contained and has a particular function	**Specialised cell**	A cell with specific features that enable it to perform a particular function.
Organelle	Specialised structures within a living cell, e.g. nucleus	**Unicellular**	The whole organism consists of a single cell.

3) How do plant and animal cells compare?



RGS SCIENCE

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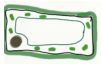
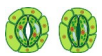
4) Can different cells do different jobs?

Multicellular organisms have many different cells.

- **Specialised cells** have a **specific role** to perform
- They have **special features** that allow them to do these jobs

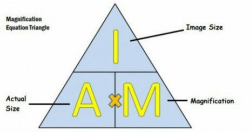
Type of cell	Found in	Adaptation
Palisade 	**Plant** leaves	Many chloroplasts for photosynthesis
Root hair	**Plant** roots	Extension from the cell to absorb water
Stomata 	**Plant** leaves	Swells up to close pores in leaves
Egg	**Animal** ovary	Store of food for growing embryo
Nerve	**Animal** nerve	Long axon transmits nervous impulses
Sperm	**Animal** testes	Has a tail for movement

5) What is magnification?

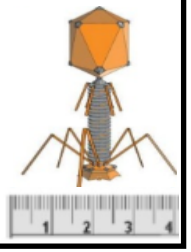
- The compound microscope contains 2 lenses. Together they produce an image of a cell that is magnified many times. What is the Total magnification?

Objective lens magnification	Eyepiece lens	Total magnification
X4 (Small red lens)	x10	X40
X10 (Medium yellow lens)	X10	X100
X 40 (long blue lens)	X10	x400

We can calculate the magnification of an image using this equation:



Actual size = 0.05um

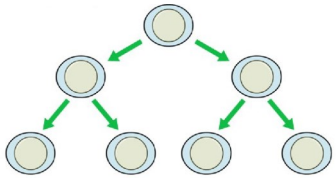


- E.g. Calculate the **magnification** of this image of a virus.

1. Read the image width (in mm) from the rule below the image (40mm)
2. **Convert** to same **unit** as actual. (1 million nm in a mm) (40,000um)
3. Divide **image** (40000) by **actual** (0.05) = **800000x magnification!**

6) How do living things get bigger?

- For an organism to grow either their cells must get bigger or the cells must divide into more.
- If a cell keeps growing in size, the increased volume of materials required inside the cell (Oxygen and glucose) would not be able to cross the membrane as quickly as they would be required.
- Instead the body is constantly producing new cells from old cells.



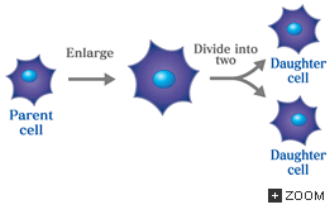
- The process is called cell division. It occurs very quickly and each new cell is able to divide.
- There are 3 main reasons for cell division.

Growth **Repair** **Reproduction**

- During the life cycle of a cell

1. The cell will **grow** in size (the organelles are copied)

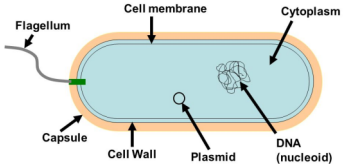
2. Chromosomes duplicate and the **nucleus divides** into two



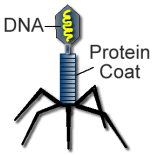
7) Are there organisms that we can't see? Microorganisms are too small to see.

They are so small they can only be seen with a **microscope.** Here are the 3 main types:

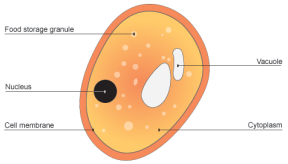
Bacteria



Virus



Fungi



A **communicable disease** is one that is caused by a microorganism. E.g.

Name of disease	Type of microorganism	Information
Salmonella	Bacteria	Food poisoning in animals
HIV	Virus	Potentially leads to AIDS in humans
Athletes foot	Fungi	Skin Infection in animals

A **non -communicable** disease that isn't caused by microorganisms. E.g. Heart disease or cancer