

# Topics covered

## Cell biology

- Organelles
- Magnification req. prac. Maths calculations.
- Electron microscopes/light
- Transport
- Mitosis

## Organisation.

- Enzymes pH req. prac. Maths rate of reaction. Describing graphs.

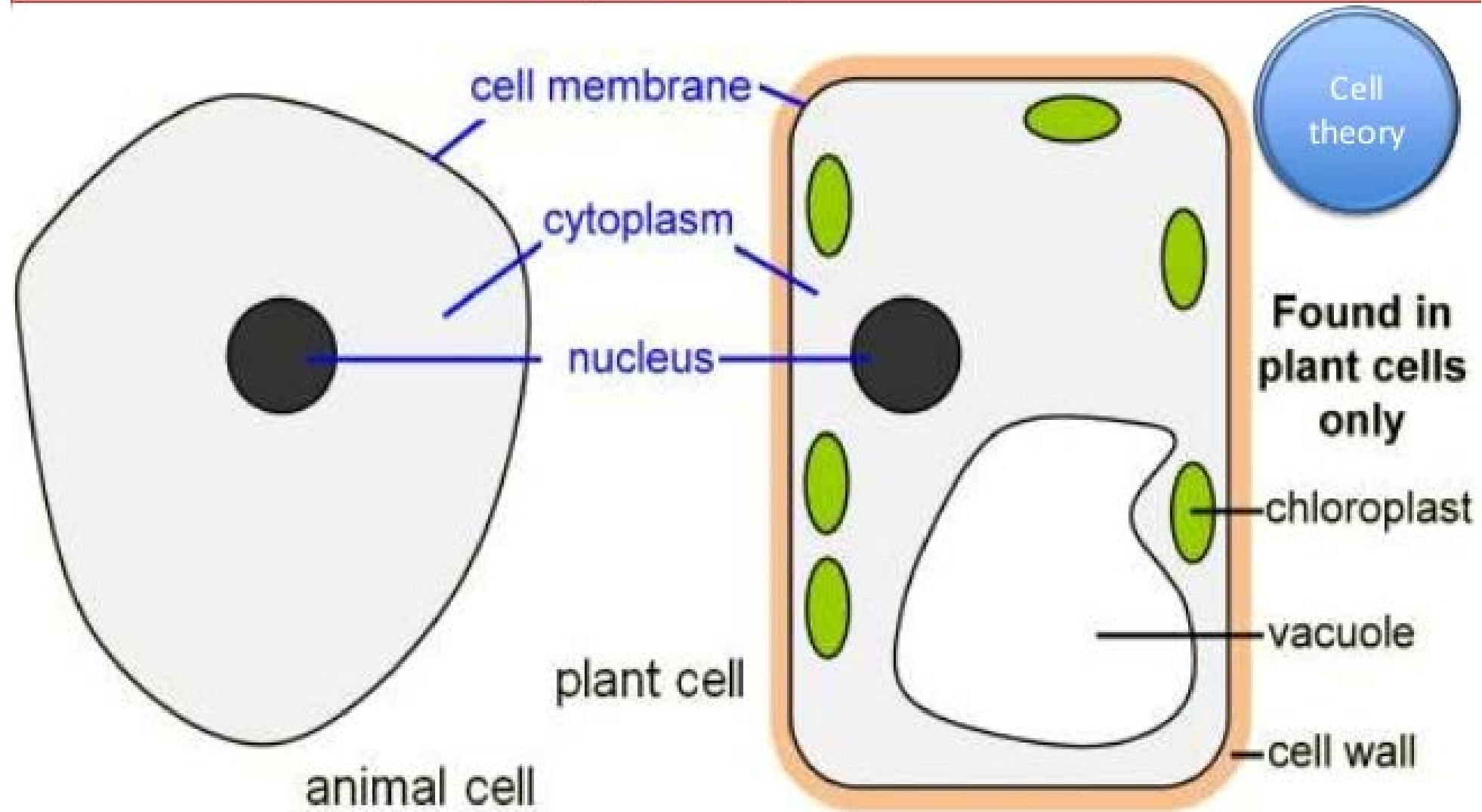
## Infection

- Human defences
- Antibiotics req prac. Maths clear zones
- Vaccination and mono clonal antibodies.
- Plant defences

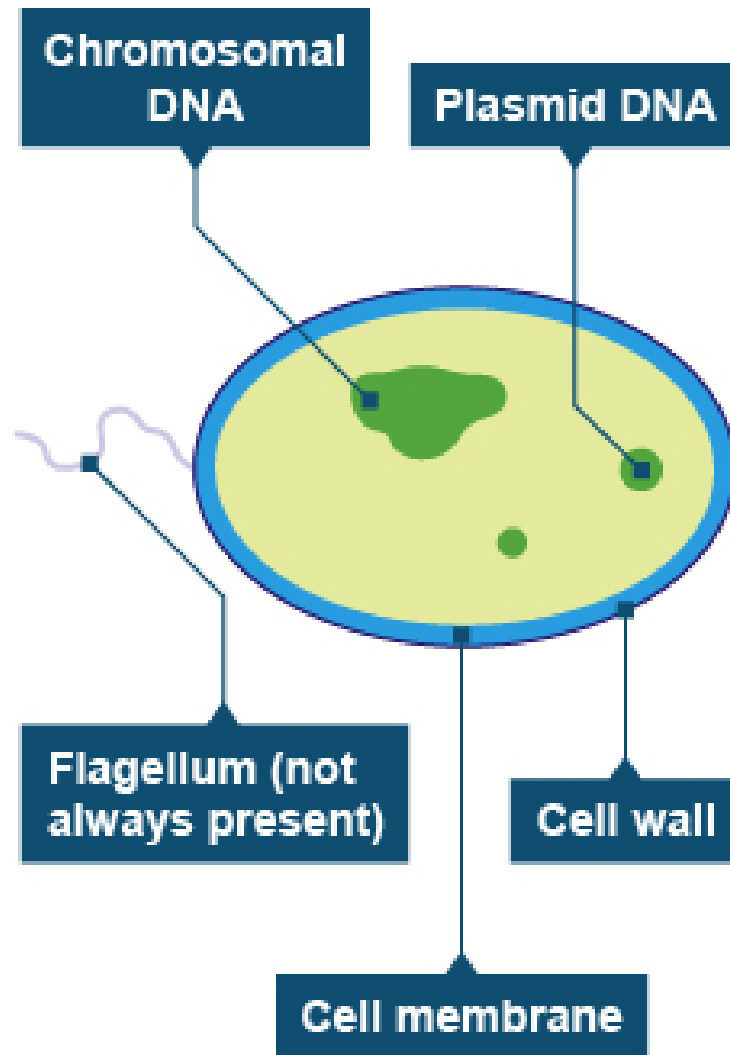
# Cell Biology

# PLANTS VS ANIMALS

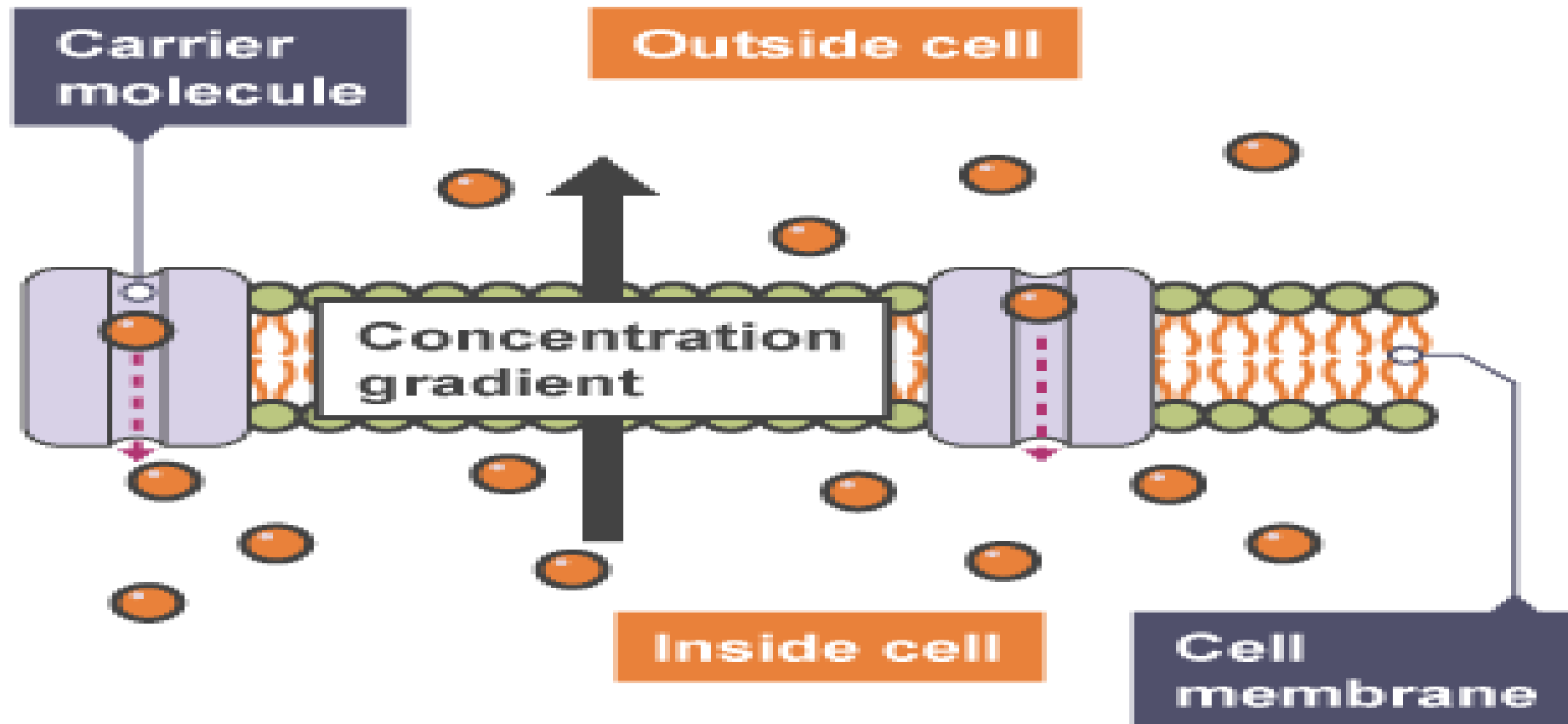
2.4 compare the structures of plant and animal cells.



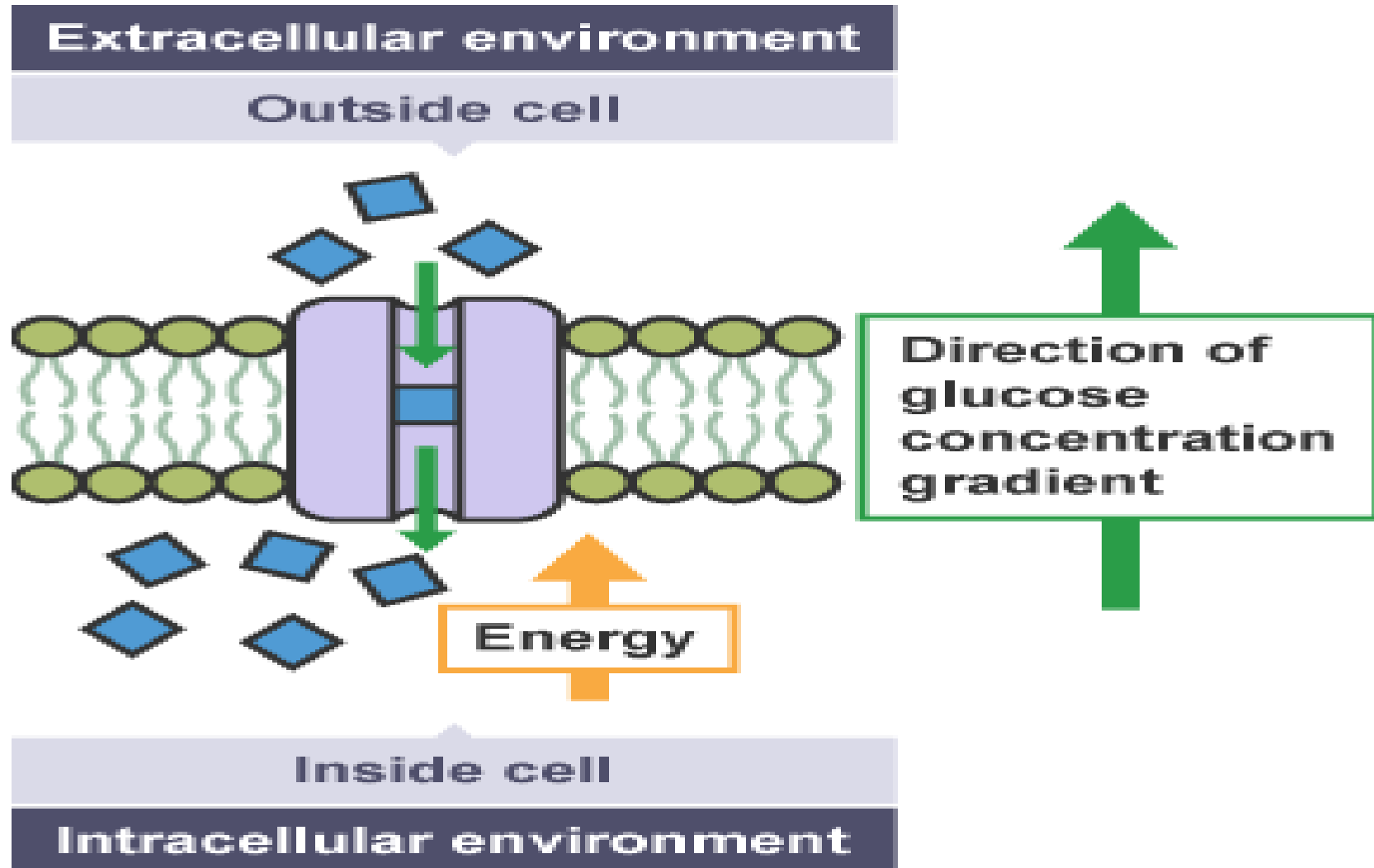
**IF YOU ARE EVER ASKED TO DRAW AND LABEL A CELL IT MUST NOT BE A GENERAL CELL, BUT A SPECIFIC CELL**



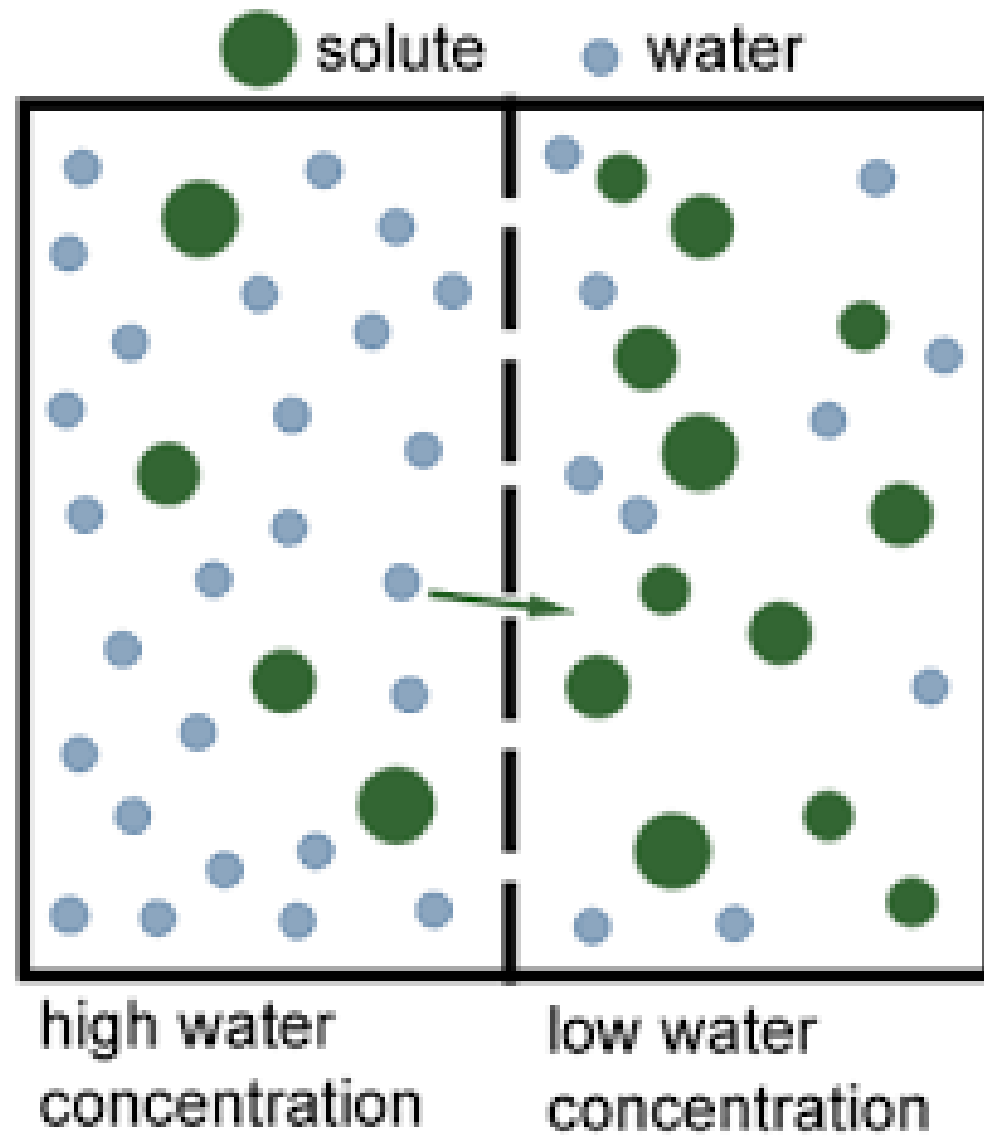
# DIFFUSION



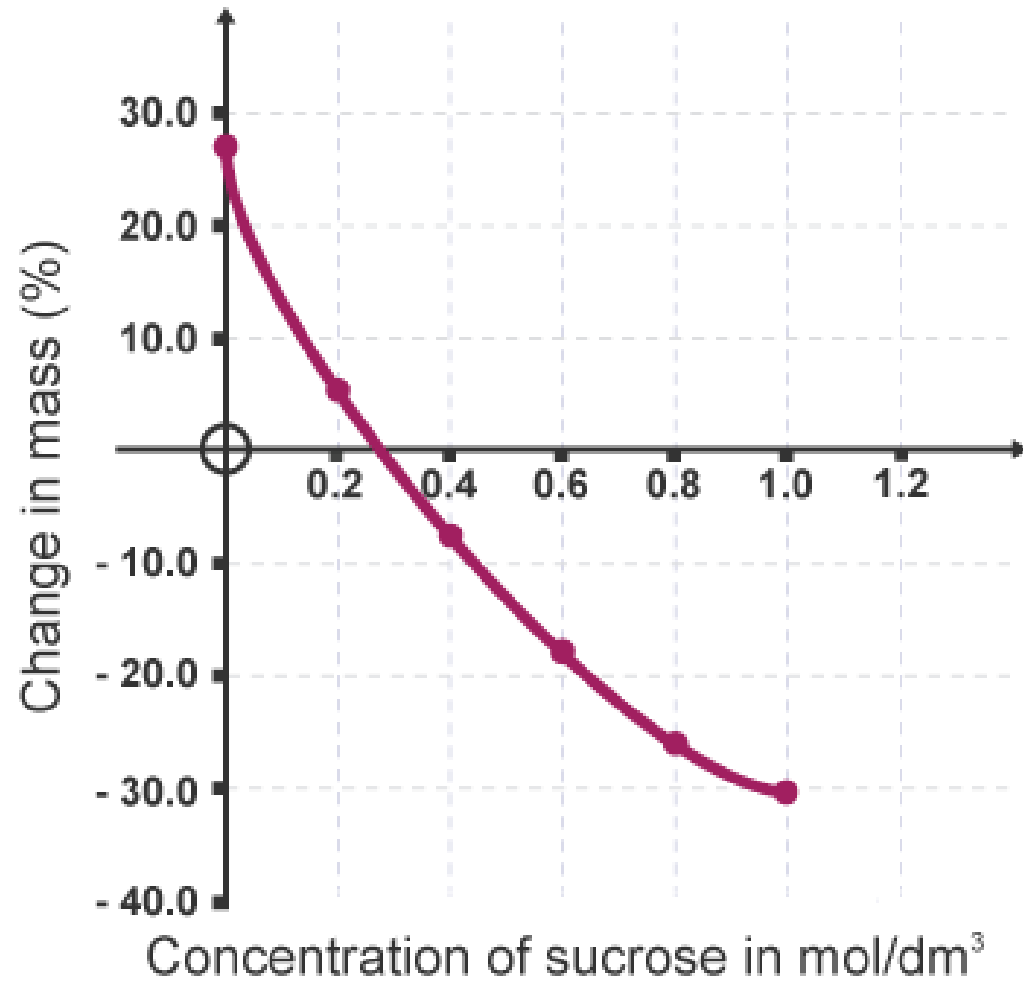
# ACTIVE TRANSPORT



# OSMOSIS

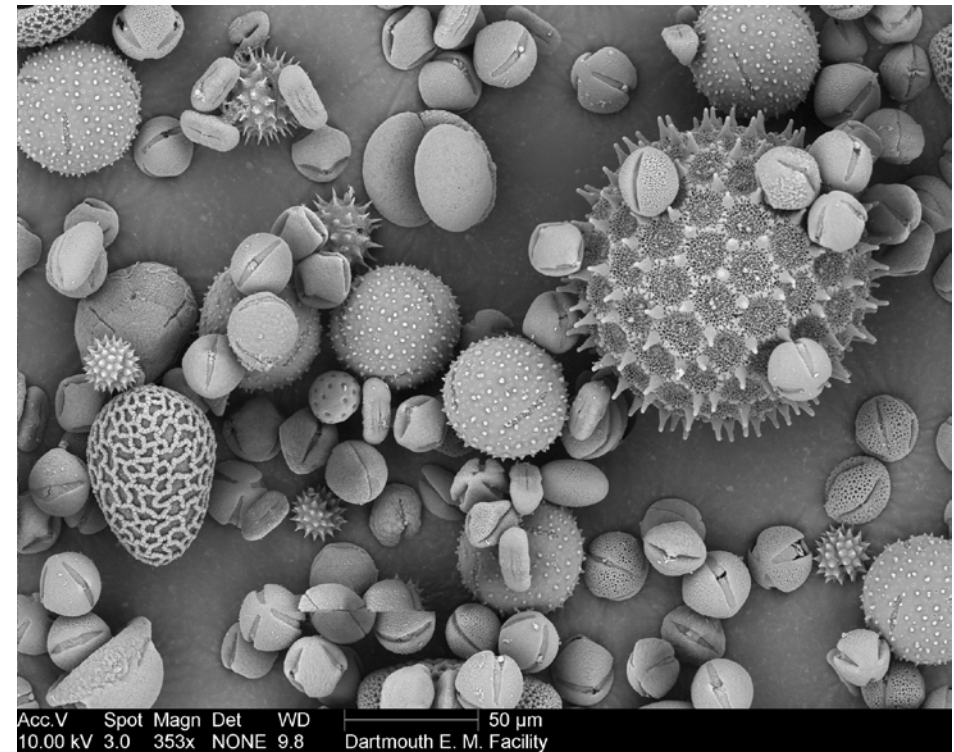


# POTATO REQUIRED PRACTICAL



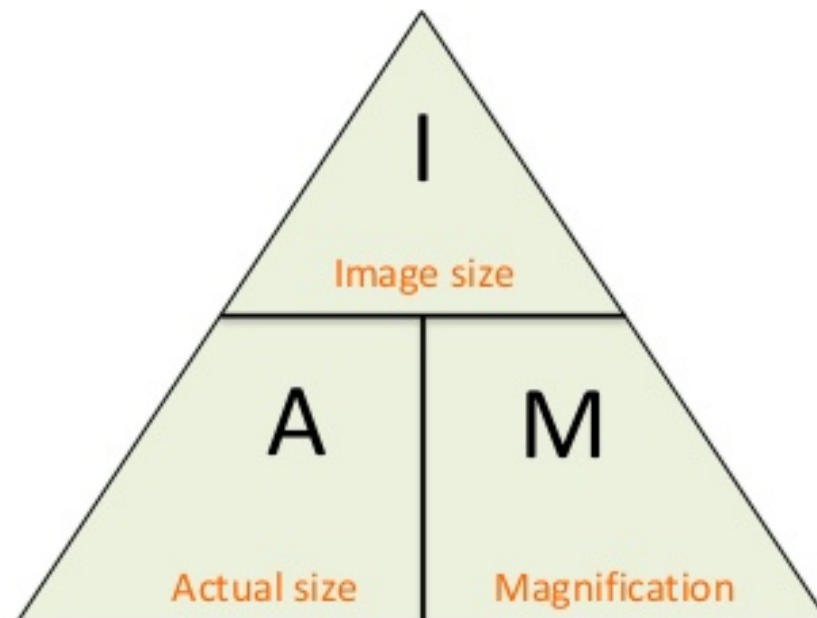


# MICROSCOPES – LIGHT AND ELECTRON





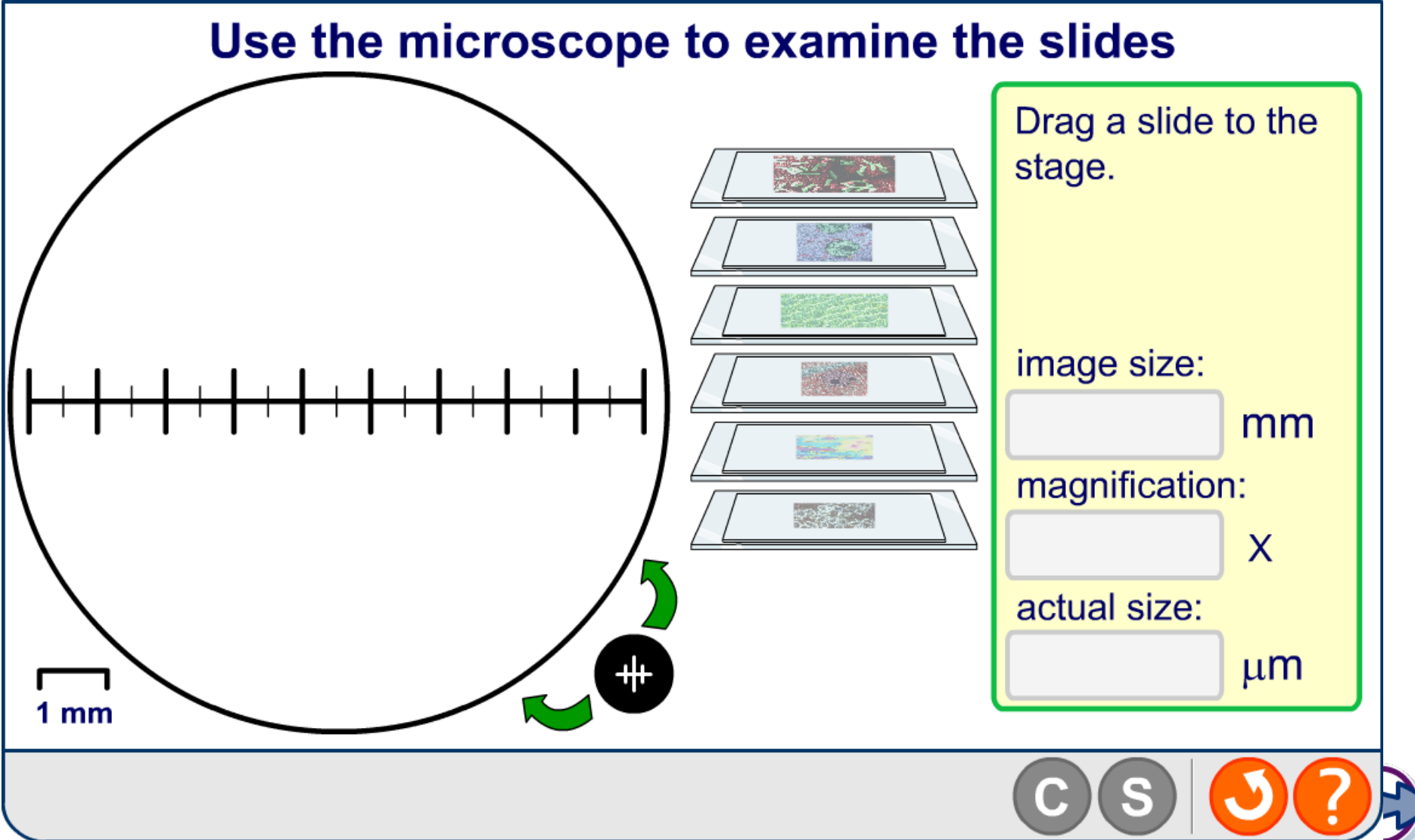
- You must be able to calculate the magnification or actual size from a micrograph (picture from a microscope).
- To do this use the **IAM** triangle.





# Virtual microscope

**Use the microscope to examine the slides**



Drag a slide to the stage.

image size:  
 mm

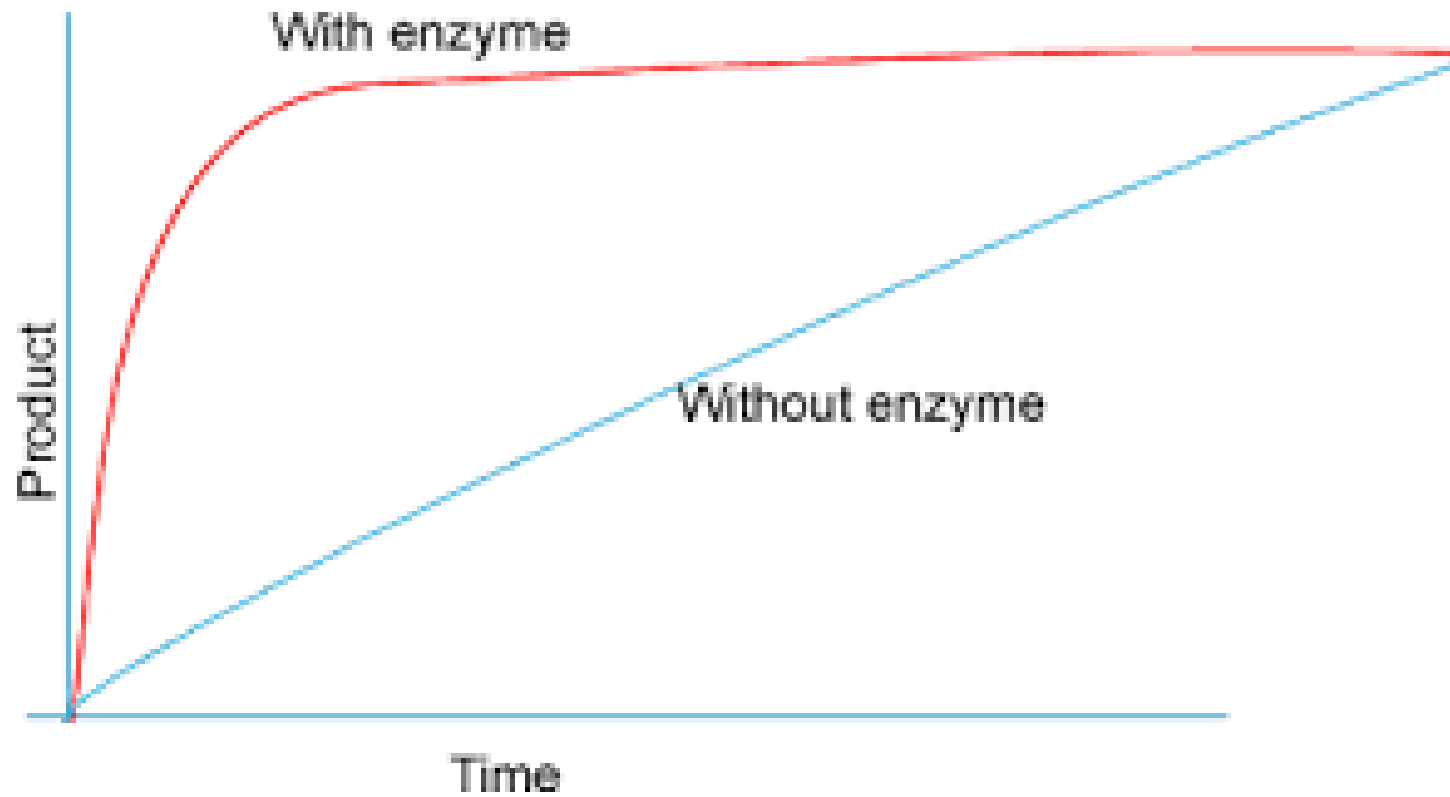
magnification:  
 X

actual size:  
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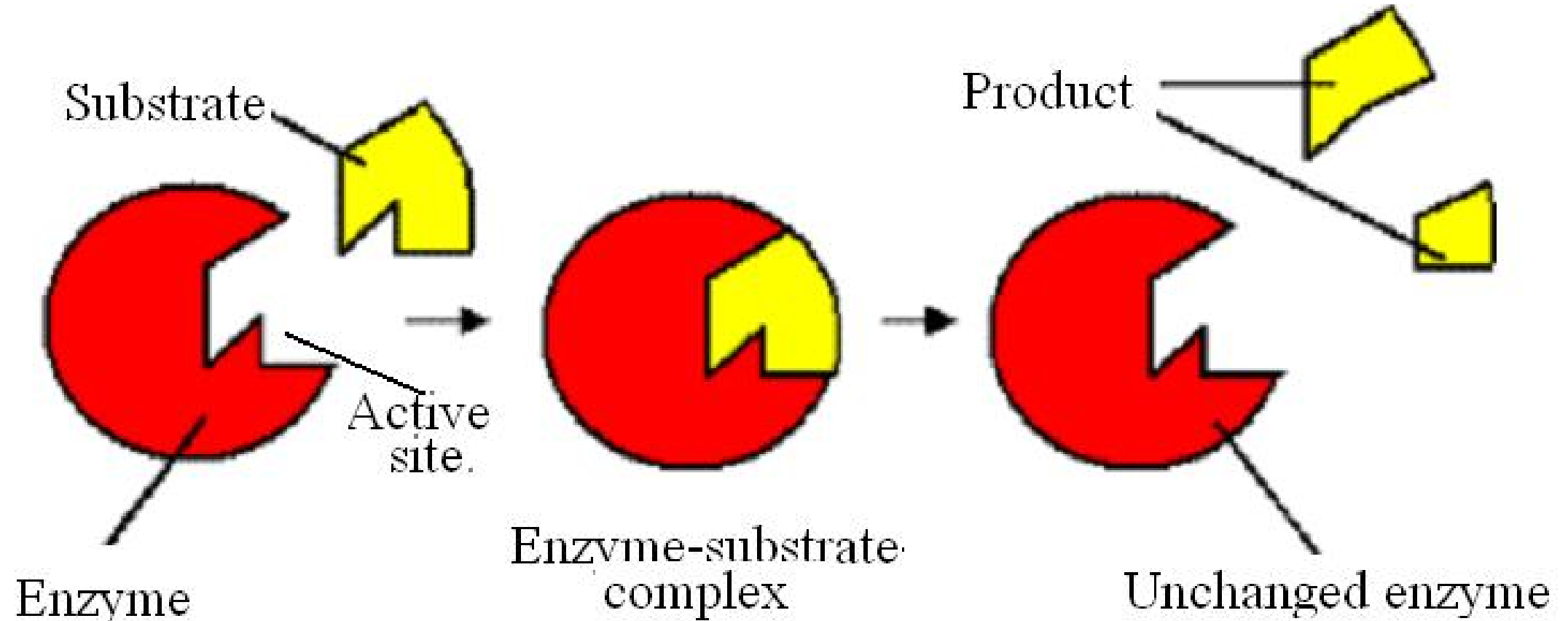
C S ↺ ? ➡

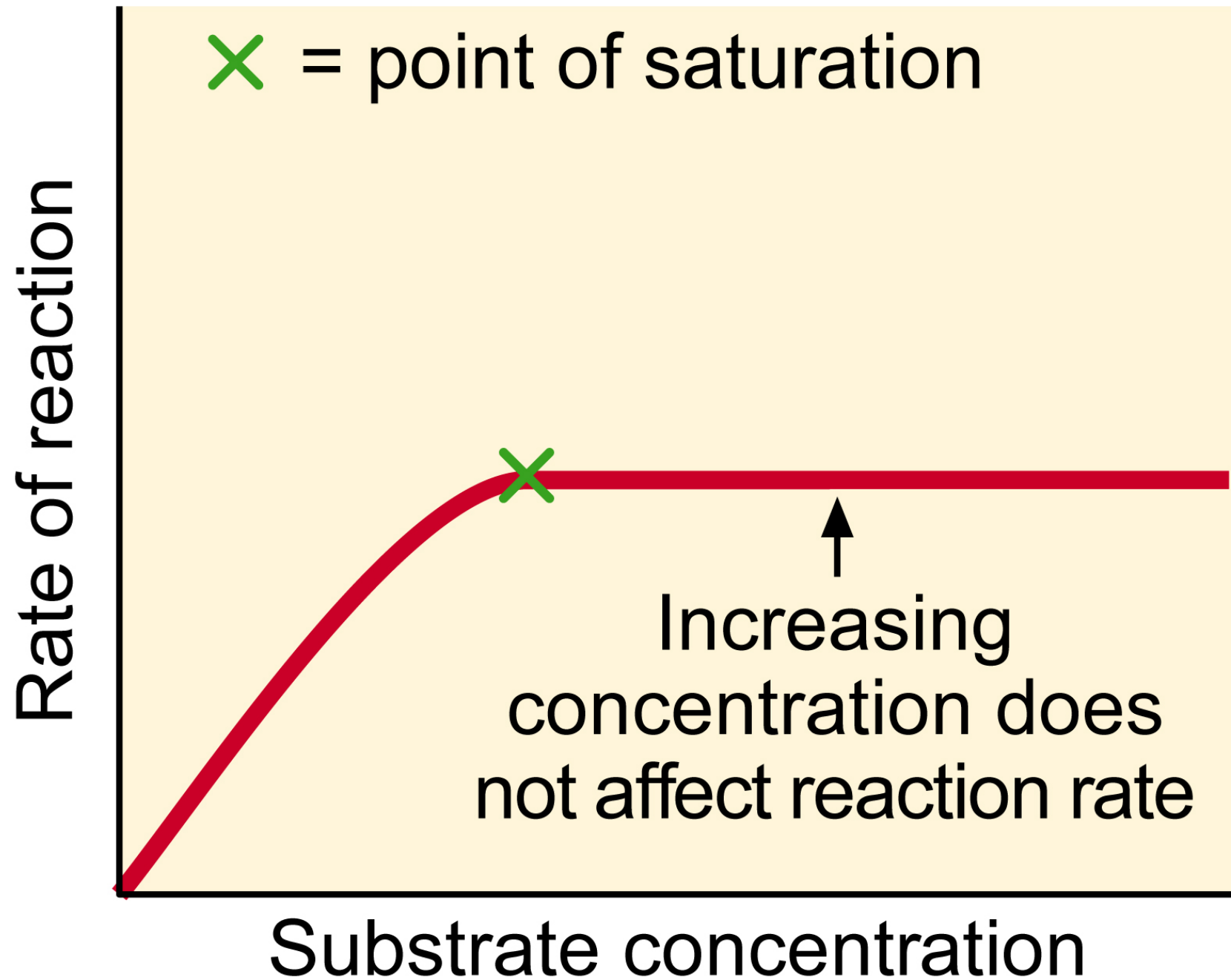
# ORGANISATION

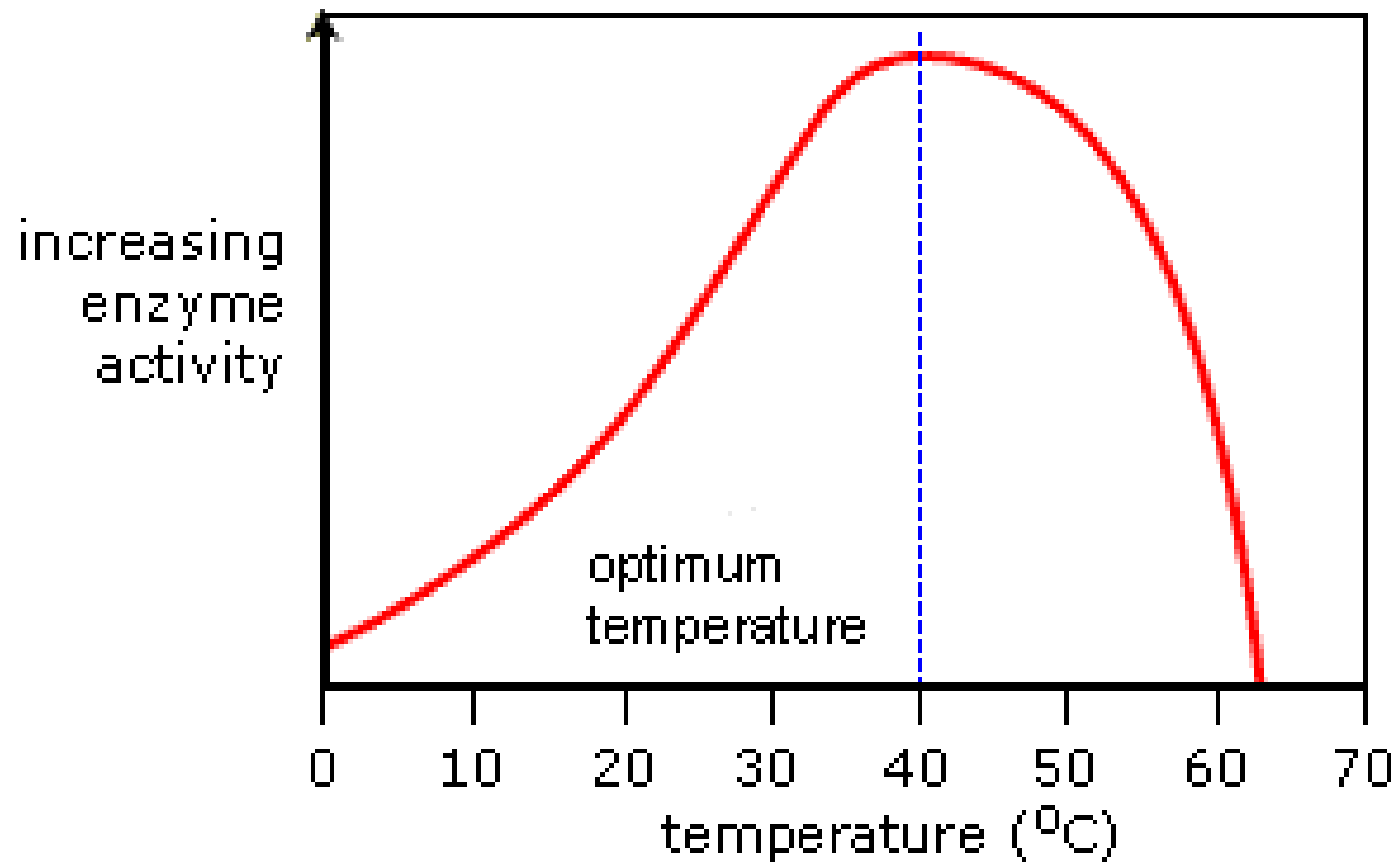
# WHAT IS AN ENZYME



# ENZYMES: KEY TERMS

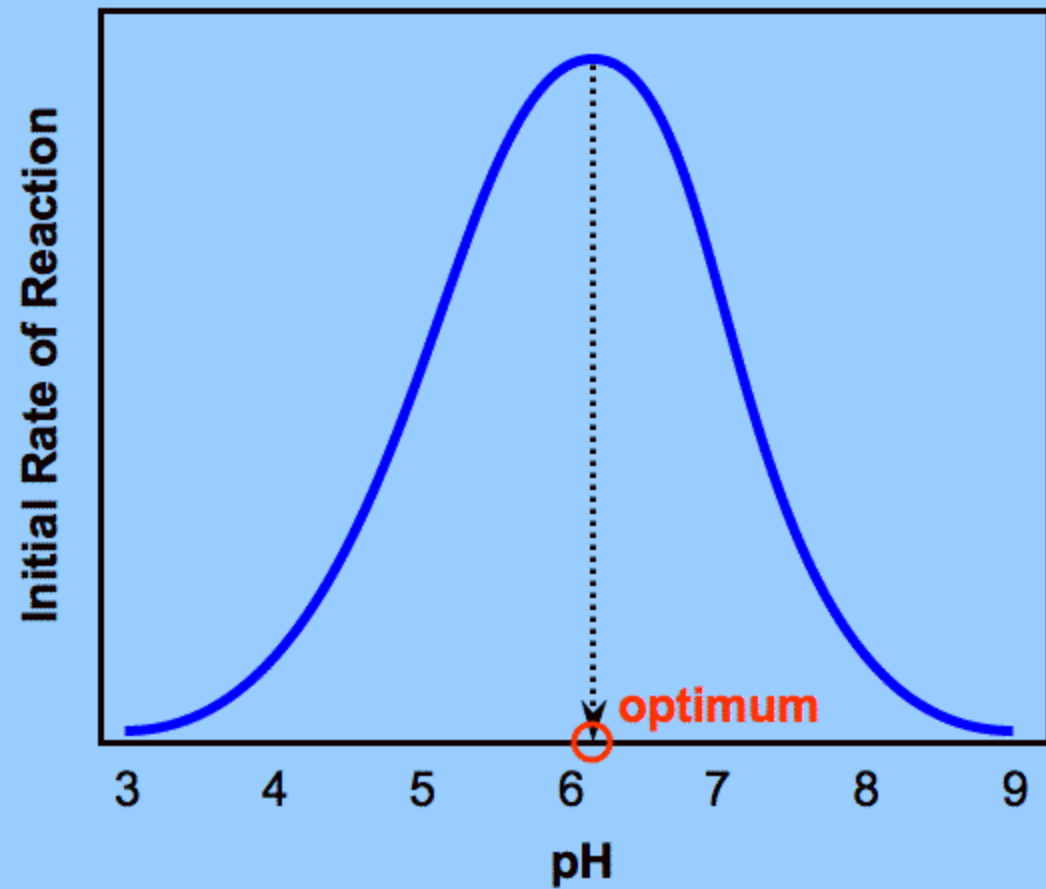






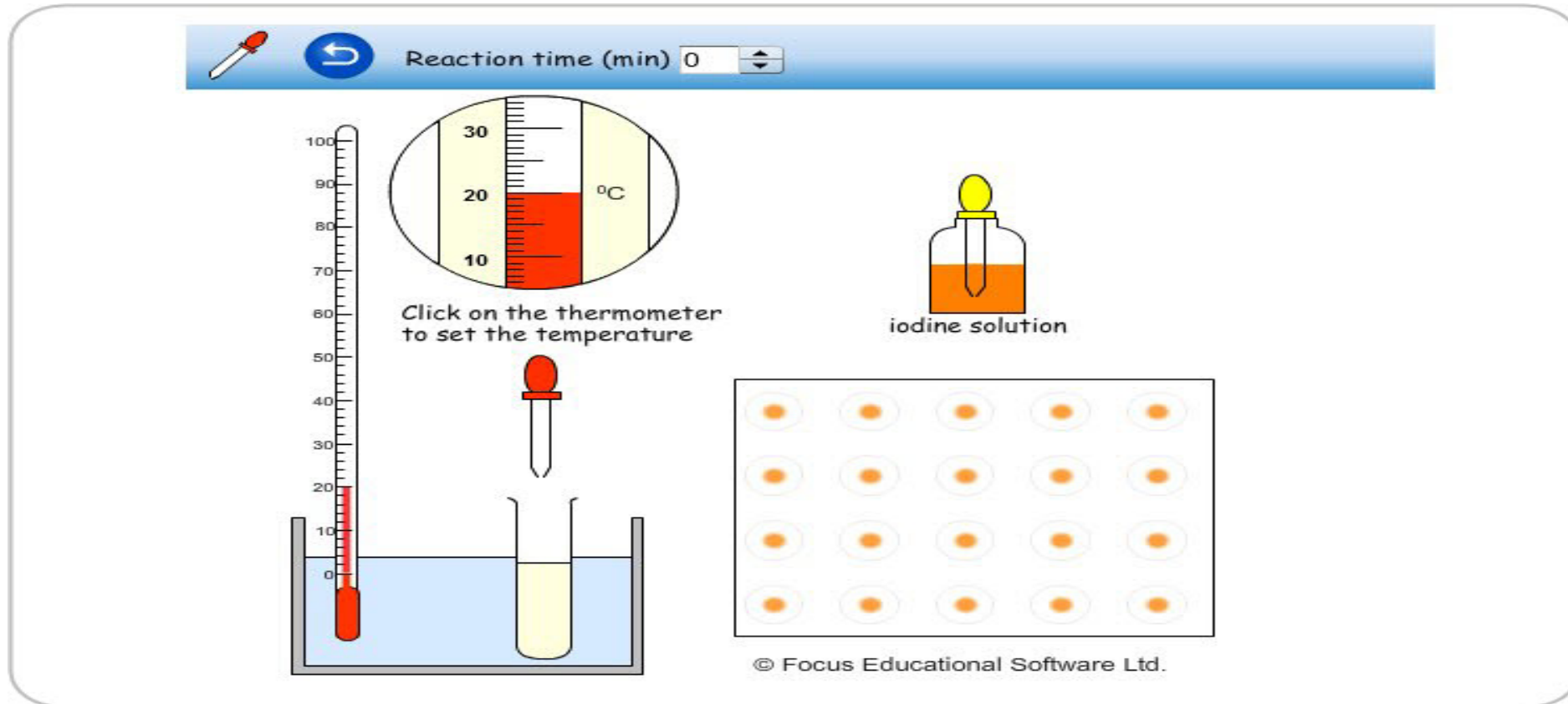


**pH influences the rate of an enzyme-catalyzed reaction**



# AMYLASE REQUIRED PRACTICAL

- AMYLASE IS AN ENZYME THAT BREAKS DOWN STARCH INTO MALTOSE

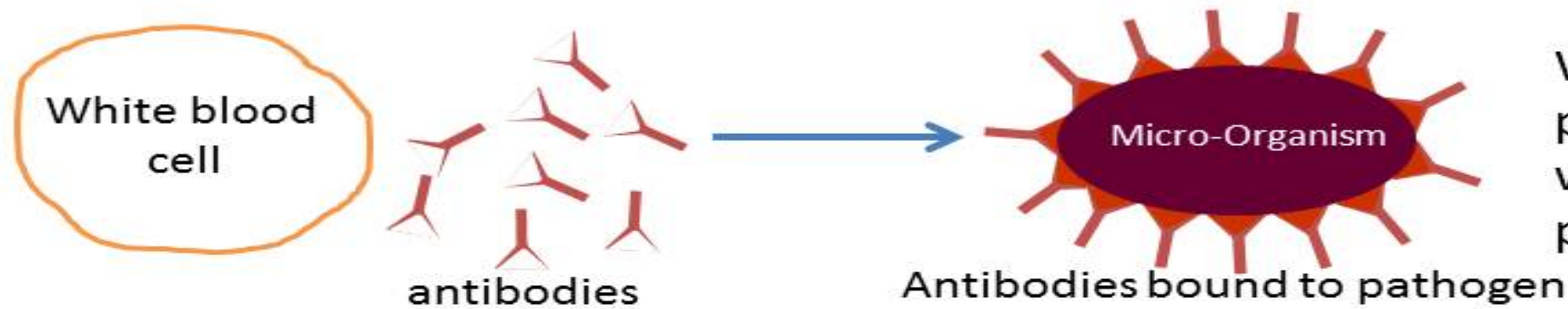


# IMMUNITY AND RESPONSE

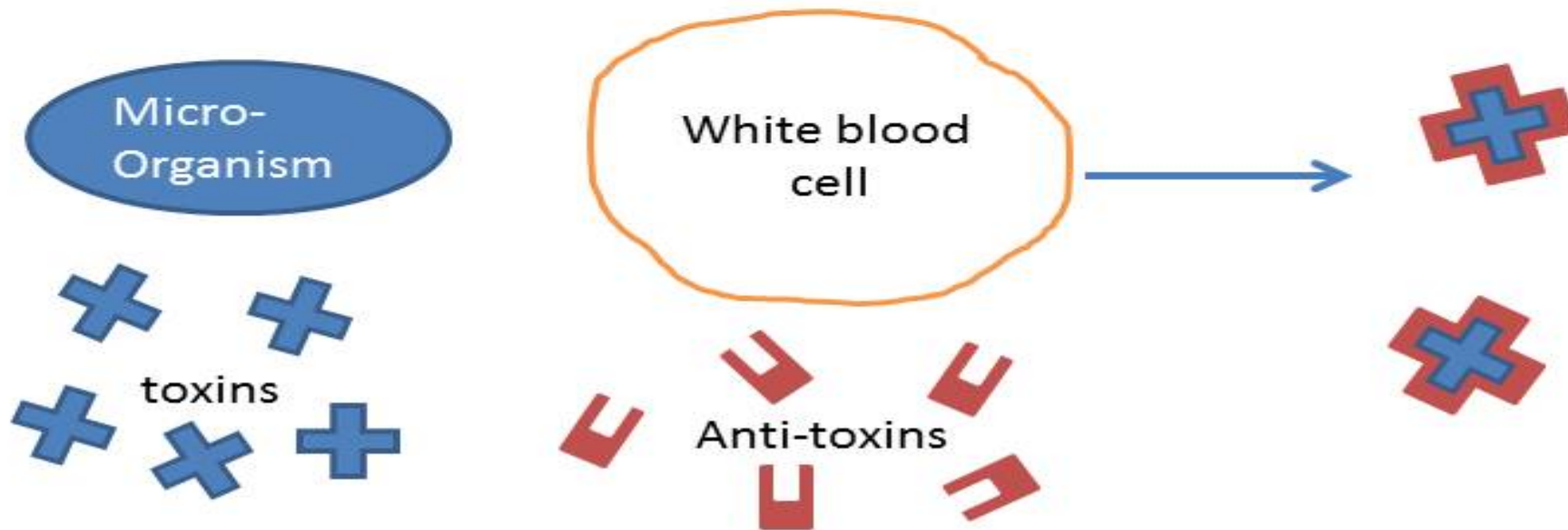
# How white blood cells protect us from disease



White blood cells may ingest pathogens



White blood cells may produce antibodies which bind to pathogens

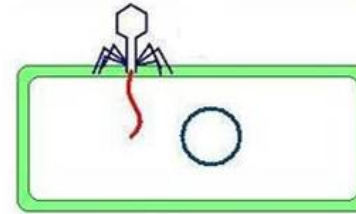


White blood cells may produce antitoxins which bind to toxins produced by the microbe.

# What if they get past our first defences??

- We become infected with a microbe.
- If enough of the microbe infects us or multiplies inside of us we may become ill.
- Bacteria grow and reproduce, they then produce toxins that make us feel ill and damage tissues.
- Viruses live and reproduce inside cells, causing damage.

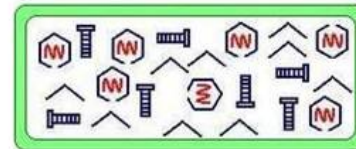
## How Viruses Reproduce



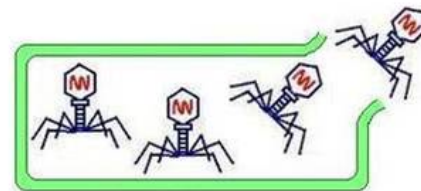
The virus injects its DNA into the cell



Virus DNA multiplies inside the cell

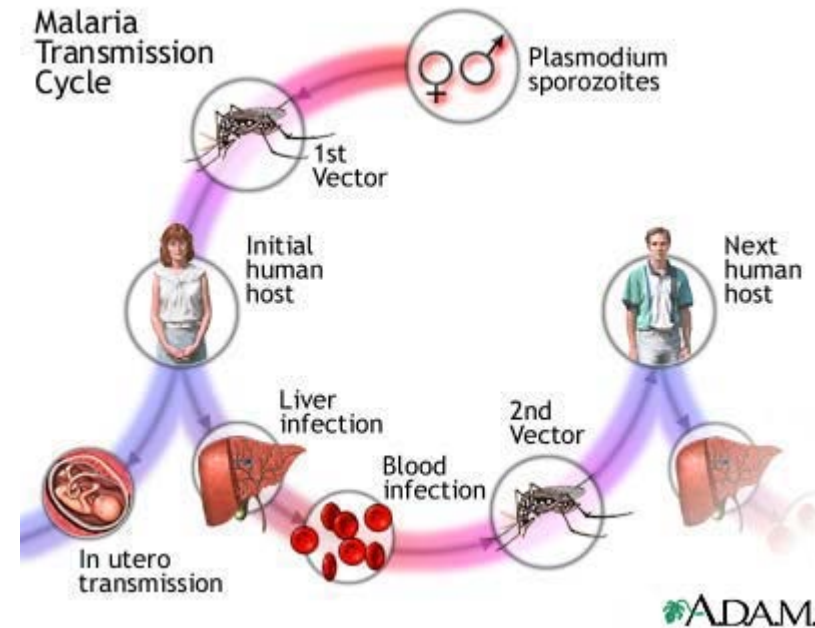


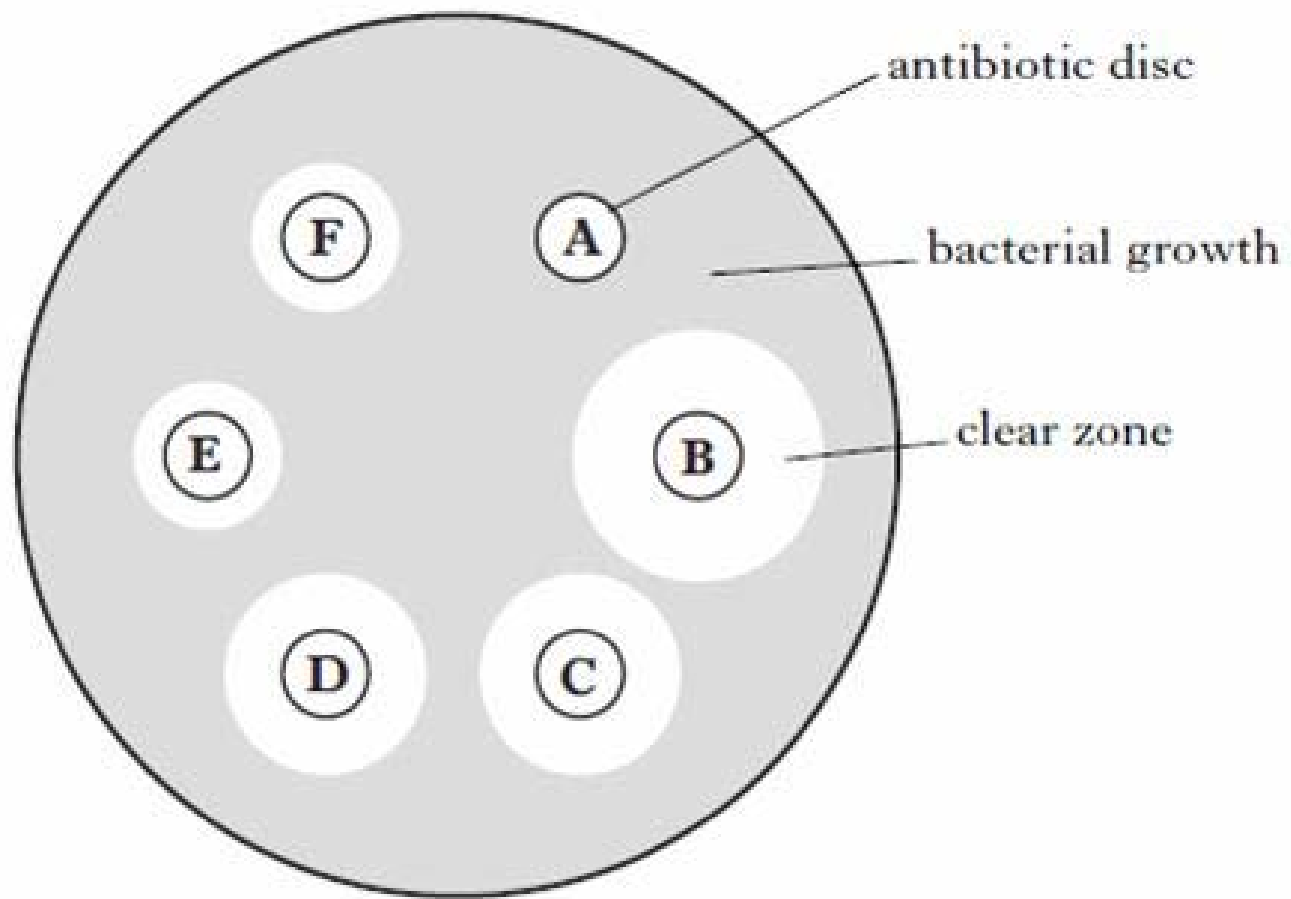
Virus DNA multiplies inside the cell



New viruses are assembled and the cell bursts releasing the viruses

- Once you're bitten,
  1. The parasite enters the bloodstream and travels to the liver.
  2. The infection develops in the liver before re-entering the bloodstream and invading the **red blood cells**.
  3. The parasites grow and multiply in the red blood cells. At regular intervals, the infected blood cells burst, releasing more parasites into the blood.
  4. Infected blood cells usually burst every 48-72 hours. Each time they burst, you'll have a bout of fever, chills and sweating.
- Malaria can also be spread through [blood transfusions](#) and the sharing of needles, but this is very rare.





Cause of plant disease	Example	Symptoms	How it causes damage to the plant
virus	tobacco mosaic virus (TMV)	mosaic pattern of discoloration on leaves	virus destroys cells, reducing plant growth because the affected areas of the leaf do not photosynthesise
bacteria	crown gall ( <i>Agrobacterium tumefaciens</i> )	crown galls – masses of unspecialised cells that often grow at the join between the root and the shoot	galls can totally encircle the plant's stem or trunk, cutting off the flow of sap to cause stunted growth and eventual death
fungus	black spot	purple or black spots (areas of decay) on the leaves leaves often turn yellow and drop early	weakens the plant as it reduces the area available for photosynthesis plant does not flower well as a result
nematode worms	root knot nematodes	damaged roots	prevent the plant getting the water and mineral ions it needs, so it fails to grow
insects	aphids	damaged stems and leaves presence of green insects covering stem	sharp mouthparts penetrate the phloem vessels to feed on sugar-rich phloem sap, damaging and weakening the plant aphids also act as vectors, transferring viruses, bacteria, and fungi between plants



# DEFICIENCY DISEASES

mineral ion deficiency (1)	nitrate ion deficiency	stunted growth	nitrate ions not present to convert the sugars made in photosynthesis into proteins needed for growth
mineral ion deficiency (2)	magnesium ion deficiency	leaves turn yellow (chlorosis)	magnesium ions not present to make chlorophyll  leaves become yellow and growth slows because the plant cannot photosynthesise fully

# Plant defence responses

- Plants have also evolved to defend themselves against attack from microorganisms, insects and herbivores.
  - **Physical defences** prevent the entry/spread of pathogens.
  - **Chemical defences** involve the production of chemicals which protect against disease.

Physical defence	Chemical defence
Cellulose cell walls resist invasion by pathogens	Antibacterial chemicals e.g. mint, witch hazel.
Tough waxy cuticles	Poisons
Layers of bark or dead cells	
Leaf fall	
Thorns	
Hairy stems or leaves	
Drooping or curling when touched <a href="#">Mimosa pudica - the sensitive plant</a>	
Mimicry (some plants droop to mimic unhealthy plants so that animals do not eat them)	