

Date: / /

Enzyme
are proteins that act as catalysts in living things that (speed up the chemical reaction)

chemical reaction that occurs in cells:
Examples: respiration, digestion, photosynthesis

what is?
enzyme [lower the activation energy] of a reaction

The energy that is needed to get a chemical reaction started

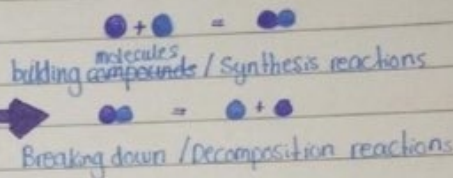
Chemical reactions

is a process that change one set of chemicals into another by changing the chemical bonds that join the part of chemical reaction

reactants = the ele... or atoms in compounds

com that enter into a chemical reaction

products = the de- or com- produced by a chemical reaction



what role do enzymes play in living things and what effects their function

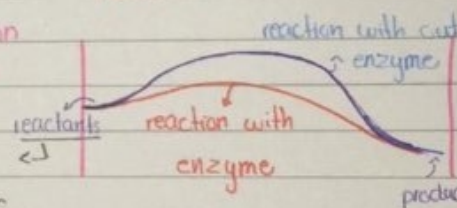
speed up the chemical reaction
- CATALYST -

the blood stream contain an enzyme called **Carbonic anhydrase**

also known as Substrates

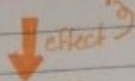
The substrate bind to a site on the enzyme called **Active Site**

lock and key



Date: / /

regulation of enzyme activity

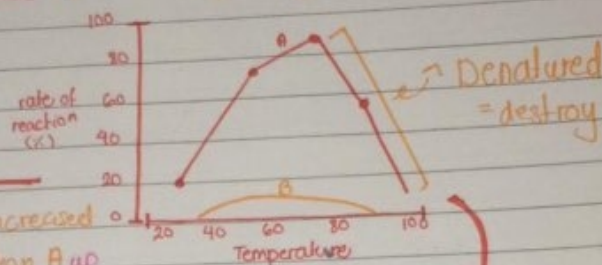


Temperature, pH and regulatory

work best temperature
close to 37°C

Describe :-

Increasing the temperature increased the rate of reaction in solution A up to the certain point, but then the rate of reaction began to fall. Temperature only had a small effect on solution B.



Which solution contained the enzyme? + why?

Solution A, this because enzymes speed up chemical reaction, and it's clear that at the same temperature, the rate of reaction is much higher in solution A than solution B.

which enzyme work best in a very acidic environment

Gastric protease

Date: / /

life is cellular [Apparent enlargement of an object / the ratio of image size to actual size.] $\hat{=}$ what is

microscope :-

labeling \rightarrow in the ipad



The microscope has 3 magnification

the total magnification is the ocular \times objective

scanning
lower power
high power

Microscope

light

electron

SEM

TEM

in the ipad

- Brief history of cell theory -

- 1 - Robert Hooke = 1665
- 2 - anton van leuwen hook = 1673
- 3 - Matthias Schleiden = 1838
- 4 - Theodor Schwann = 1839
- 5 - rudolf virchow = 1855

The cell theory 3

1 - all living thing are composed of one or more cell.

2 - the cell is the basic unit of structure, and function in all living things.

3 - all cells come from preexisting cells.

Brief history of cell theory

Scientist's name	What did he do?
Robert Hooke	Looked at a <u>thin slice of cork</u> Named the boxes " <u>cells</u> "
Anton van Leeuwenhoek	Used a handmade microscope He saw his teeth bacteria and called them " <u>animalcules</u> "
Matthias Schleiden	Identified the first plant cells and concluded that <u>all parts of a plant is made of cells</u>
Theodor Schwann	He concluded that <u>all organisms are made up of one or more cells</u> .
Rudolf Virchow	Proved that <u>cells arise from other cells</u> , not from non-living matter

Types of Electron Microscopes

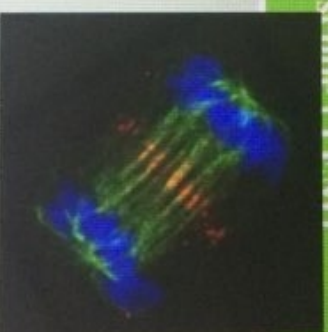
Scanning Electron Microscope (SEM)



A beam of electrons scan over the surface of the specimen and give a 3D image.

specimens viewed under a scanning electron microscope do not have to be cut into thin slices to be seen.

Transmission Electron Microscope (TEM)



produce flat, two-dimensional images

Cells and tissues must be cut first into ultra thin slices before they can be examined

Light vs Electron Microscopes

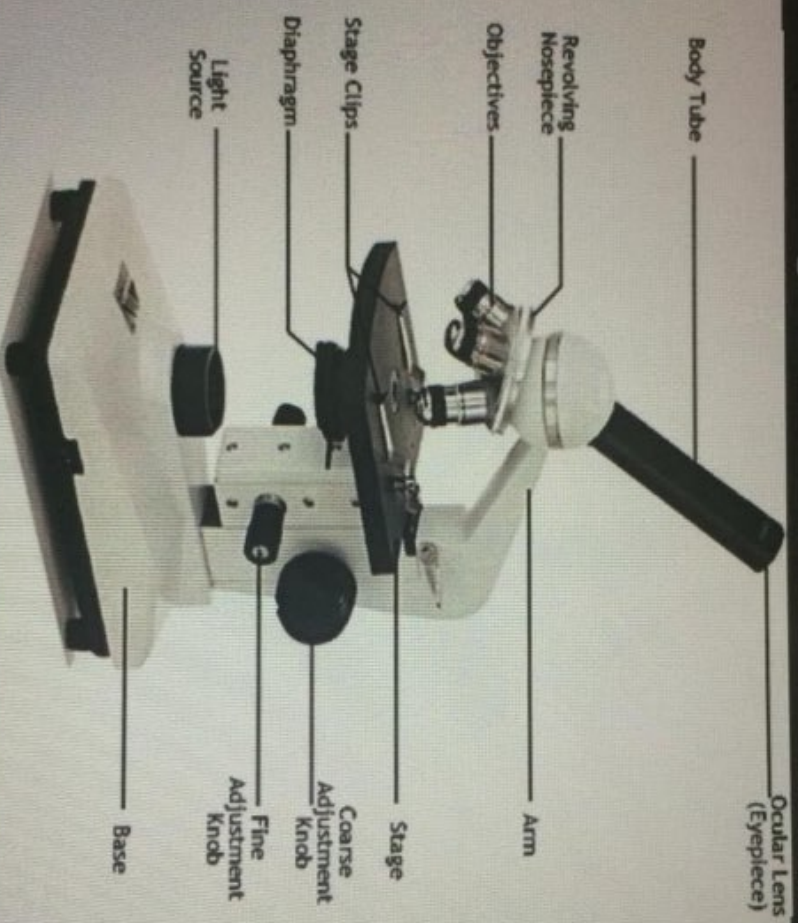
Light Microscope	Electron Microscope
Allows light to pass through the specimen and uses two lenses to form an image.	Use a beam of electrons that are focused by magnetic fields
Lower resolution	Higher resolution (used for smaller specimens, more details)
No vacuum needed	Vacuum needed (because of electrons)
Can be used for living or non-living specimens	Can be used for nonliving specimens only
Stains and dyes are used to color parts of the specimen	Images can only be colored by using computer programs; no staining or dyes.

Magnification

Your microscope has 3 magnifications: Scanning, Low and High. Each objective will have written the magnification. In addition to this, the ocular lens (eyepiece) has a magnification. The total magnification is the ocular x objective

	Magnification	Ocular lens	Total Magnification
Scanning	4X	10X	40X
Low Power	10X	10X	100X
High Power	40X	10X	400X

Light microscope- Labeling



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the labeling is in the ipad

prok / Euk cells

identify the
general structure

on the
ipad

The Similarities + differences

The difference -

prokaryotic

1- Do not have ~~nucleus~~

2- Small + simple

3- DNA floating in cytoplasm

Ex: Bacteria

Eukaryotic

Have nucleus

large + complex

DNA inside of nucleus

Ex: animal cell, plant cell

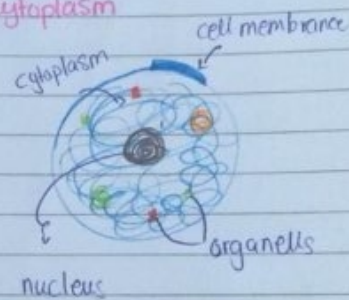
Human cell

1- they have DNA

2- ribosomes

3- cell membrane

4- cytoplasm



The cell membrane

made up of -

double layered - lipid bilayer

phospholipids

- carbohydrate chain

- protein channels

nucleus

found in the cytoplasm

chromatin
a complex of DNA
bound to proteins

nuclear
envelope
surrounds
the nucleus

nucleolus

Cytoskeleton

microfilaments

microtubules

- help cells
move
- made up of
protein called
actin

is where the assembly
of ribosomes begins

made up of proteins known
as tubulin

Physical

Date: / /

Fun... → Control movement in and out side the cell... + protect and support the cell

Cell membrane

Made up of :-
+ Function = on ipod

Selectivity permeable membrane

Semipermeable membranes

also called

why it's called:-

Fluid mosaic model

because the proteins can move and float among the lipids + So many different kinds of molecules make up the cell membrane

phospholipids

Hydrophilic Head

love water



Hydrophobic

fatty acid tail

Hate water

→ leave cell =

water + CO_2

water

→ enter the cells =

ions, O_2 , food

Date: / /

When does it stop?

Equilibrium

Diffusion → Dissolved Solutes



ex. Oxygen

Facilitated diffusion



ex. ions + Glucose

Osmosis



water molecules

energy
- Does not need
- from high to low
(down concentration)

passive transport

there are three

free moving of
water from
high to low
concentration

The effects of osmosis in a cell

Hypotonic Hypertonic isotonic

osmosis in

cell

require energy
"ATP"

Active transport

Hypotonic Hypertonic isotonic

osmosis in cell → Aquaporin

require energy "ATP"
-from to High
(against concentration gradient)

Active transport

there are two

molecular

(protein pump
using a protein)

K^+ , Na^+

Bulk → No protein

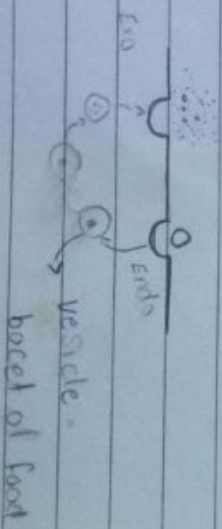
Endocytosis
in to cell

phagocytosis
Food

pinocytosis
Fluids

Exocytosis
out of cell

waste



1.4 Describe the functions of the key organelles in the cell including nucleus, vacuoles, vesicles, lysosomes, cytoskeleton, centrioles, ribosomes, endoplasmic reticulum, Golgi apparatuses, mitochondria, chloroplast, cell membrane and cell wall

1.5 Relate, using diagrams, between the structure and function of key cell organelles including nucleus, vacuoles, vesicles, lysosomes, cytoskeleton, centrioles, ribosomes, endoplasmic reticulum, Golgi apparatuses, mitochondria, chloroplast, cell membrane and cell wall

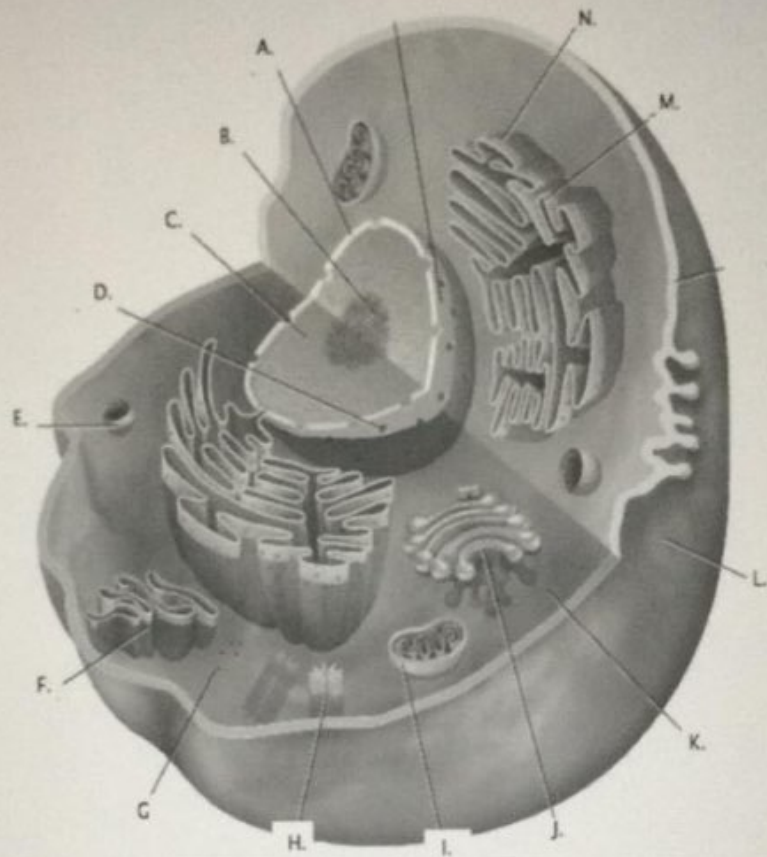
Organelle	Structure	Function
Cell wall	Rigid, tough, made of cellulose	Protects and supports the plant cell
Cell membrane ✓	Composed of a phospholipid bilayer, with protein channels and carbohydrate chains. تتألف من طبقة ثنائية فوسفورية ، مع قنوات البروتين وسلاسل الكربوهيدرات	Protects the cell and moves materials in and out of the cell

	Structure	Function
Cytoplasm ✓	Jelly like substance that contains organelles	Pads and supports organelles inside the cell.
Nucleus	<p>-Dense, ball shaped structure, contains DNA.</p> <p>-Covered with two membranes with pores.</p> <p>-And has Small dark area inside called nucleolus.</p> <p>Nucleolus</p>	<p>It protects the DNA of eukaryotic cells</p> <p>Nucleolus is the site of assembly of ribosomes.</p> <p>هو موقع لتجميع ريبوسوم</p>
Ribosomes ✓	Found in cytoplasm or on the endoplasmic reticulum.	They produce proteins by following the coded instructions that come from DNA.
ENDOPLASMIC RETICULUM	<p>Consists of flattened sacs يسمى من الأوتار المسطحة</p> <p>- خشن: موقع التعديلات ونقل البروتينات التي تم إنتاجها حديثاً</p> <p>- الملساء: موقع إنتاج الدهون</p>	<p>- Rough: site of <u>modifications</u> and transport of newly made proteins</p> <p>- Smooth: site of production of <u>lipids</u></p>
GOLGI APPARATUS or Golgi body	<p>Stack of flattened membranes</p> <p>The organelle functions to package and deliver protein</p>	Modifies, sorts, and packages proteins and other materials that come from ER
Chloroplast	Green structures that contain chlorophyll	Capture sunlight energy for photosynthesis.
Mitochondria	<p>Location in the cytoplasm, bean shaped</p> <p>Inner membrane is folded. This increases surface area. More space for more energy to be produced.</p>	<p>Supplies energy for the cell. They are called the power houses of the cell.</p> <p>This organelle functions in cellular respiration</p>
Vacuole	Saclike structures	Storage for food, water, wastes or enzymes
VESICLES	Small membrane enclosed structures	Store and move materials between cell organelles and to and from the cell.
LYSOSOME	Small organelles filled with enzymes	Removes "junk" that accumulates in the cell. They break down lipids, carbohydrates, and proteins.
Centrioles	Are located near the nucleus in animal cells only	Help organize the cell division
Cilia and Flagella	Microtubule projections of the cell	Help in movement and beating

Organelle	Prokaryotes	Plant Cells	Animal Cells
Cell Wall	X	X	
Vesicle		X	X
Chloroplast		X	
Cytoplasm	X	X	X
Endoplasmic reticulum		X	X
Golgi apparatus		X	X
Lysosome		X	X
Mitochondria		X	X
Nucleolus		X	X
Nucleus	DNA only	X	X
Cell membrane	X	X	X
Large central vacuole		X	
Ribosome	X	X	X
Small Vacuoles			X

	Structure	Function	Prokaryote	Eukaryote:	
				Animal	Plant
Cellular Control Center	Nucleus	Contains DNA	<i>Prokaryote DNA is found in cytoplasm.</i>	✓	✓
Organelles That Store, Clean-Up, and Support	Vacuoles and vesicles	Store materials		✓	✓
	Lysosomes	Break down and recycle macromolecules		✓	✓ (rare)
	Cytoskeleton	Maintains cell shape; moves cell parts; helps cells move	<i>Prokaryotic cells have protein filaments similar to actin and tubulin.</i>	✓	✓
	Centrioles	Organize cell division		✓	
Organelles That Build Proteins	Ribosomes	Synthesize proteins	✓	✓	✓
	Endoplasmic reticulum	Assembles proteins and lipids		✓	✓
	Golgi apparatus	Modifies, sorts, and packages proteins and lipids for storage or transport out of the cell		✓	✓
Organelles That Capture and Release Energy	Chloroplasts	Convert solar energy to chemical energy stored in food	<i>In some prokaryotic cells, photosynthesis occurs in association with internal photosynthetic membranes.</i>		✓
	Mitochondria	Convert chemical energy in food to usable compounds	<i>Prokaryotes carry out these reactions in the cytoplasm rather than in specialized organelles.</i>	✓	✓
Cellular Boundaries	Cell wall	Shapes, supports, and protects the cell	✓		✓
	Cell membrane	Regulates materials entering and leaving cell; protects and supports cell	✓	✓	✓

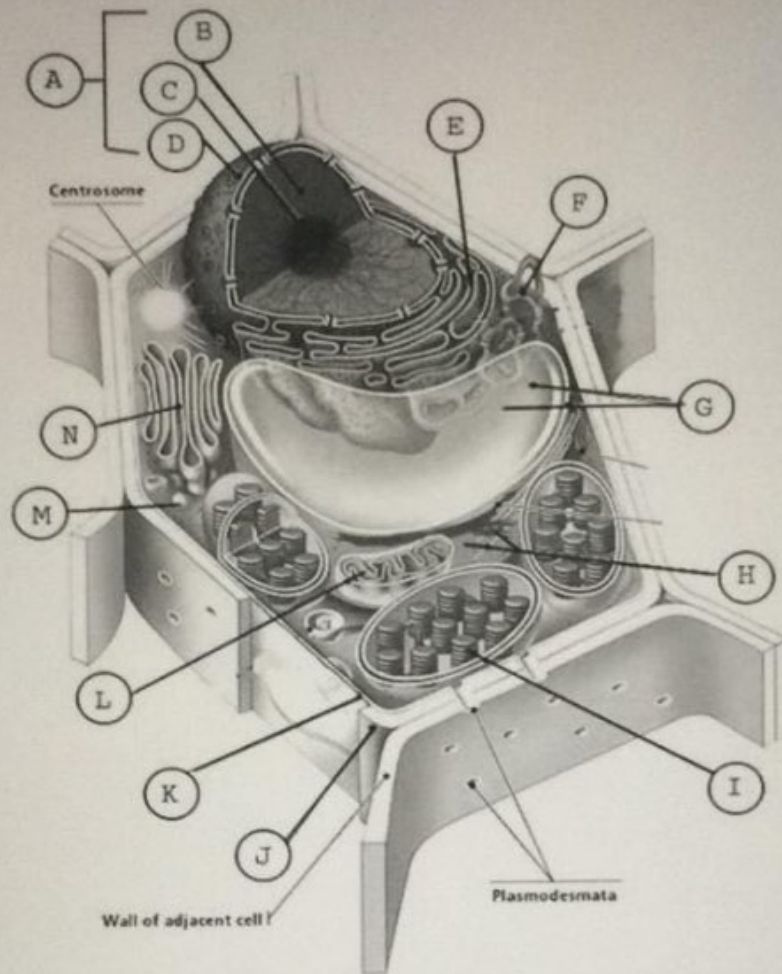
1.



A	B	C	D	E	F	G	H
Nuclear envelope	nucleolus	chromatin	Nuclear pore	lysosome	Smooth ER	ribosomes	Centrioles

I	J	K	L	M	O
Mitochondria	Golgi body	Cytoplasm	Cell membrane	Rough ER	Ribosomes attached to ER

2



A	B	C	D	E	F	G	H
Nucleus	Chromatin	Nucleolus	Nuclear envelope	Rough ER	Smooth ER	Central vacuole	Cytoskeleton

I	J	K	L	M	N
Chloroplast	Cell wall	Cell membrane	Mitochondrion	vesicle	Golgi body