

ionic bonds

- donation of an electron
- from crystals like salt
- attraction is so strong that one pulls electrons from the other
- extremely polar

covalent bonds

- sharing electrons
- electrons are attracted to those with higher electronegativity
- separations of charges is called polarity

covalent bonds explained

polar

- uneven sharing of electrons
- **ex:** water, sugars, nucleic acids

non-polar

- even sharing of electrons
- **ex:** lipids, fats, waxes

electron configuration and valence electrons

element	atomic number	total electrons	valence of electrons
c	6	6	
cl	17	17	7
o	8	8	6
n	7	7	2 or 5

trace elements

- trace metals
- minerals present in living tissues in small amounts

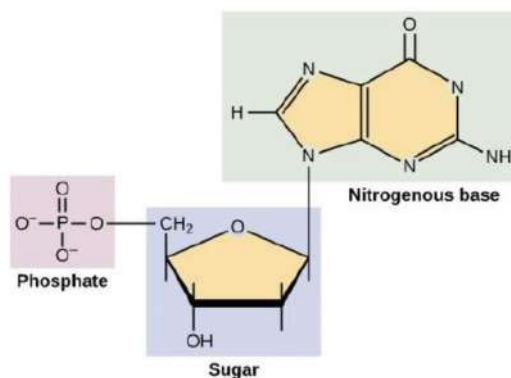
ex: zinc, copper, cobalt

- key macromolecules in the continuity of life
- carbon, hydrogen, oxygen, nitrogen, & phosphorus

nucleotide

parts

- pentose sugar
- phosphate group
- nitrogen base



Table

macromolecule	monomer unit	type of bond	primary function
carbohydrate	monosaccharides	glycosidic	provide energy & structure
lipids	not applicable	covalent	protection insulation
protein	amino acids	peptide	carry out cell processes
nucleic acid	nucleotides	phospho-diester	store information

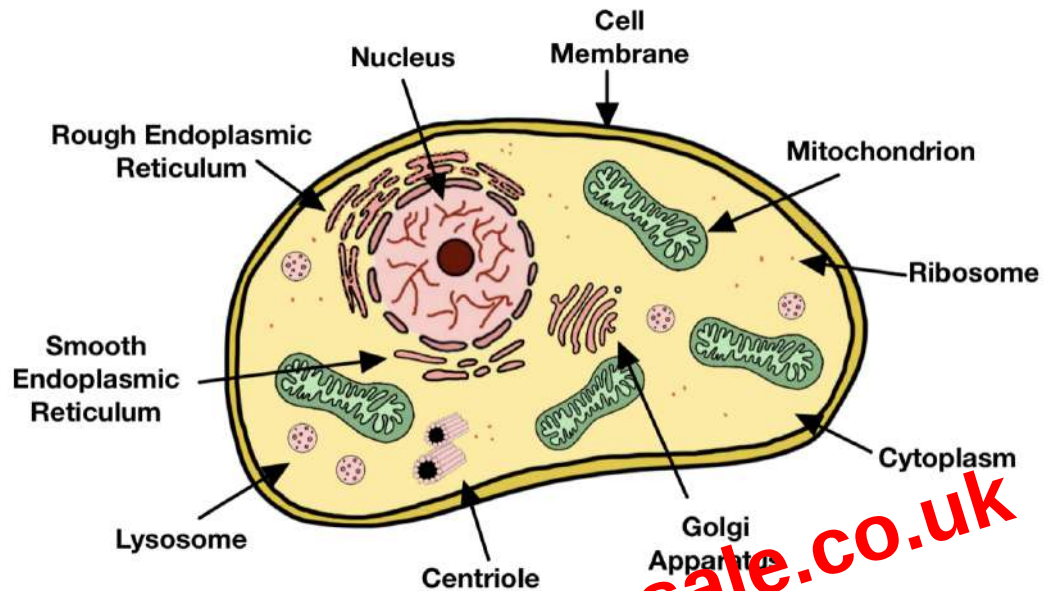
3.1. cell structure

cell theory

- proposed by schleiden and schwann
- all living things are composed of one or more cells
- basic building blocks of all organisms
- cells are the basic unit of life
- all cells come from pre-existing cells

- membrane-bound organelle
- single or multicellular
- plants and animals

▼ image



organelles

- "organelle" means "little organ"
- have specialized cellular functions, as each of the organs have specialized functions

compartmentalization

- distance structures in eukaryotic cells that have specific functions necessary for complete cell function

▼ responsible for

- genetic information
- protein synthesis
- energy
- cell functions and properties

- transport
- anchors cells in place
- cell division

centrosome (animal cells)

- located in center of cell
- comprised of microtubules
- create microtubules necessary for cell division

flagella & cilia (animal cells)

- located outside cell
- comprised microtubules
- used for cell motility, movement of other molecules in tissue

endomembrane system

- set of organelles membrane-bound that function together to carry out major functions of the cell

▼ parts

nuclear envelope

- lysosomes
- vesicles
- endoplasmic reticulum → rough (contains ribosomes) & smooth (does not)
- golgi apparatus → complete the processing and decides where the product goes\\

nucleus

- membrane-bound
- largest organelle in animal cells
- ▼ houses chromosomes (dna) and protein
 - nuclear envelope → controls what goes in or out, membrane of nucleus
 - nucleolus → inside nucleus, where ribosomes are created

- provides structure, stability, and protection to cell
- determines shape
- plant cells, fungi, prokaryotes, and some protist
- animal cells do not have cell walls
- composed of cellulose (fiber) in plant cells
- composed of peptidoglycan in bacteria (procaryotes)

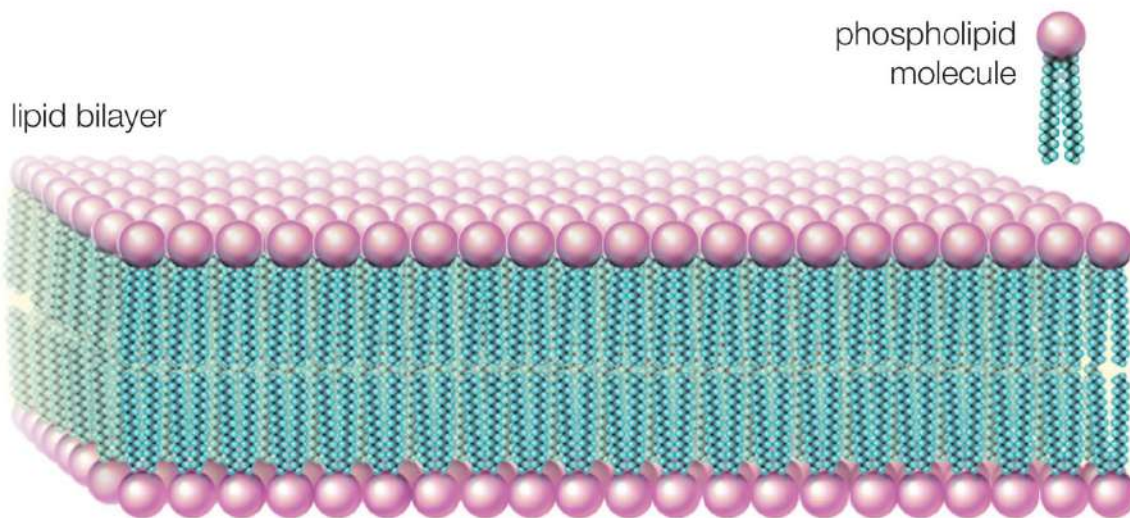
chloroplasts

- plant organelles only
- carry out photosynthesis → conversion of light energy into chemical energy
- internal structures called thylakoids → contain chlorophyll

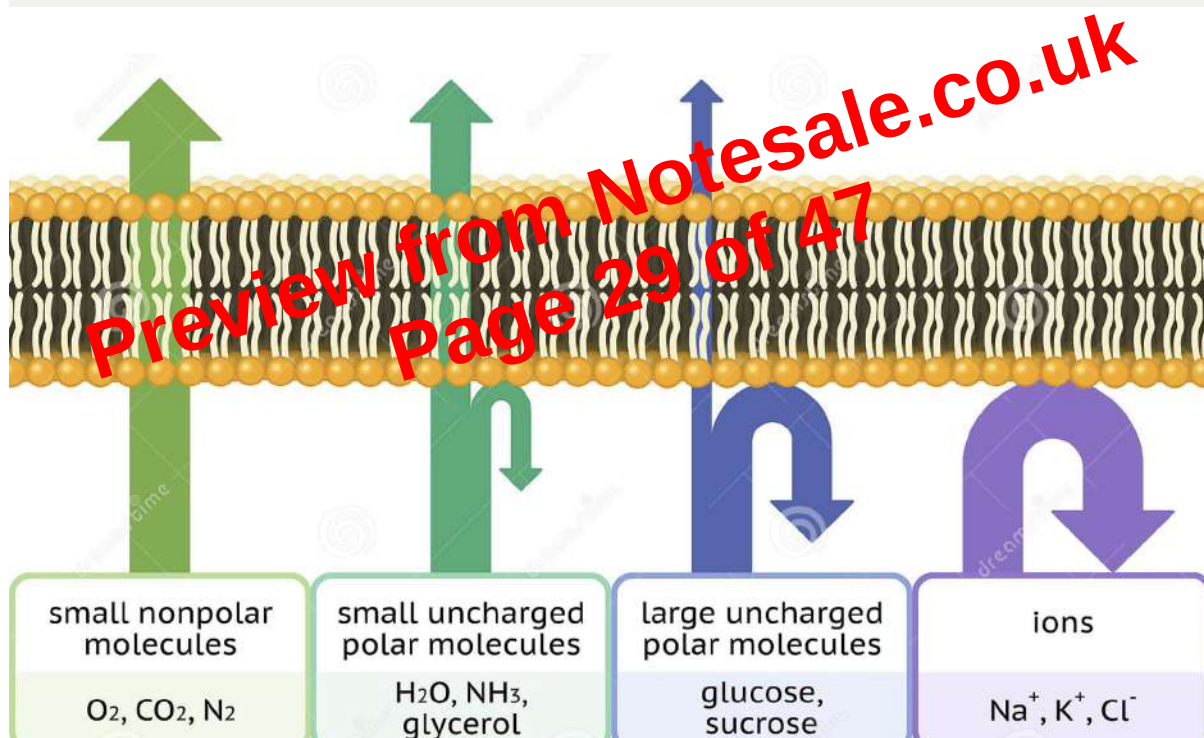
3.2. cell membrane

phospholipids

- bilayer
- fluid mosaic model → things can move around but they keep their shape due to attraction
- blue → fatty acyl tails → carbon atoms
- pink → glycerol
- allow/regulate movement of molecules



selective permeability



types of tails

single bond tails

- carbon as a molecule wants to have four bonds
- three hydrogens

- the ability to differentiate between different types of molecules, only allowing some molecules through while blocking others
- for the cell to maintain its internal order irrespective of the changes to the environment

transport

passive

- moving a solution **with** the concentration gradient

▼ diffusion

- movement of solutes

types:

▼ facilitated diffusion

- protein assisted diffusion
- assisted by a transport

▼ osmosis

- movement of water



solute to solvent always move high concentration to low concentration to reach equilibrium

tonicity

- in reference to the environment
- a solution can cause a cell to lose or gain water

hypertonic solution

- water is pulled outside of the cell
- crenation

isotonic solution

- water is circulating normally
- regular