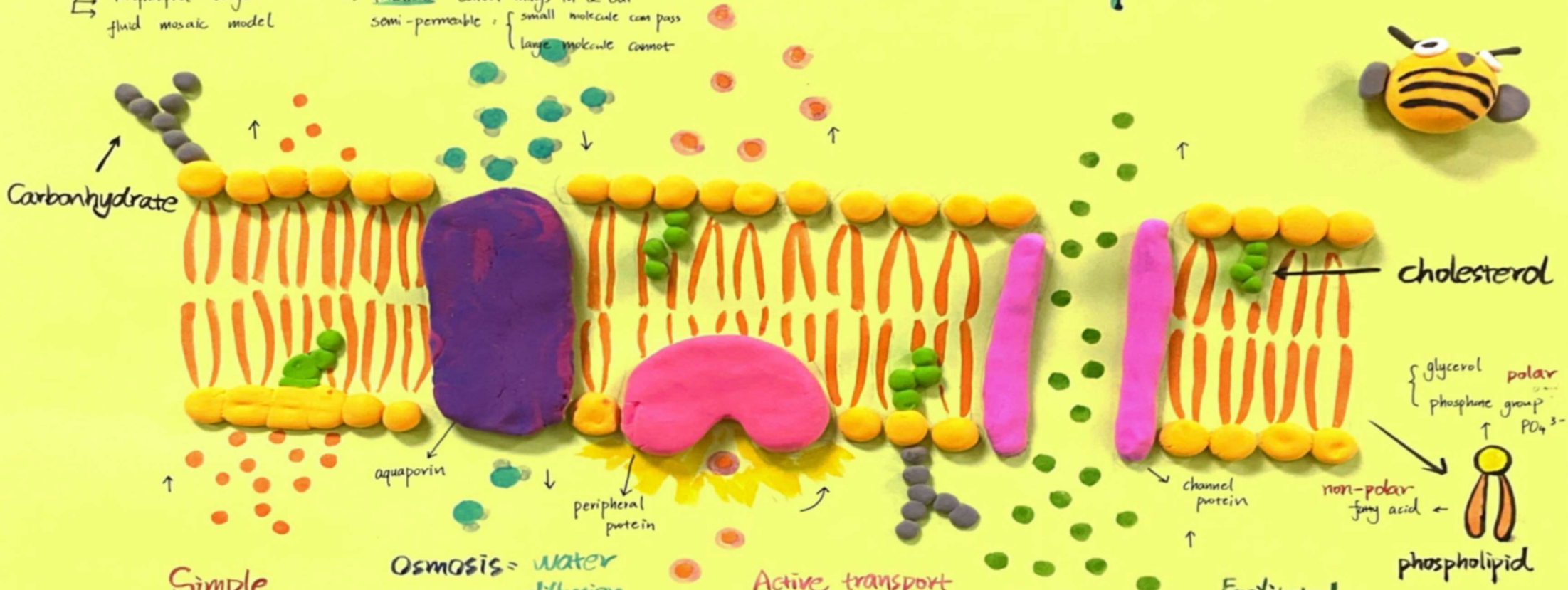
Cell Membrane & Cellular Transportation

↳ Phospholipid bilayer
fluid mosaic model

↳ Functions: control things in & out
semi-permeable : { small molecule can pass
large molecule cannot



Simple Diffusion

- moving from high concentration to low concentration.
- no need protein
- no need energy

Osmosis = water diffusion

- moving from high water potential to low water potential
- no need protein
- no need energy

Active transport

- moving from low concentration to high concentration
- need energy
- need protein

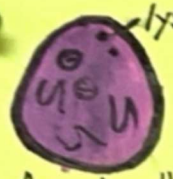
Facilitated Diffusion

- moving from high concentration to low concentration
- need protein
- no need energy

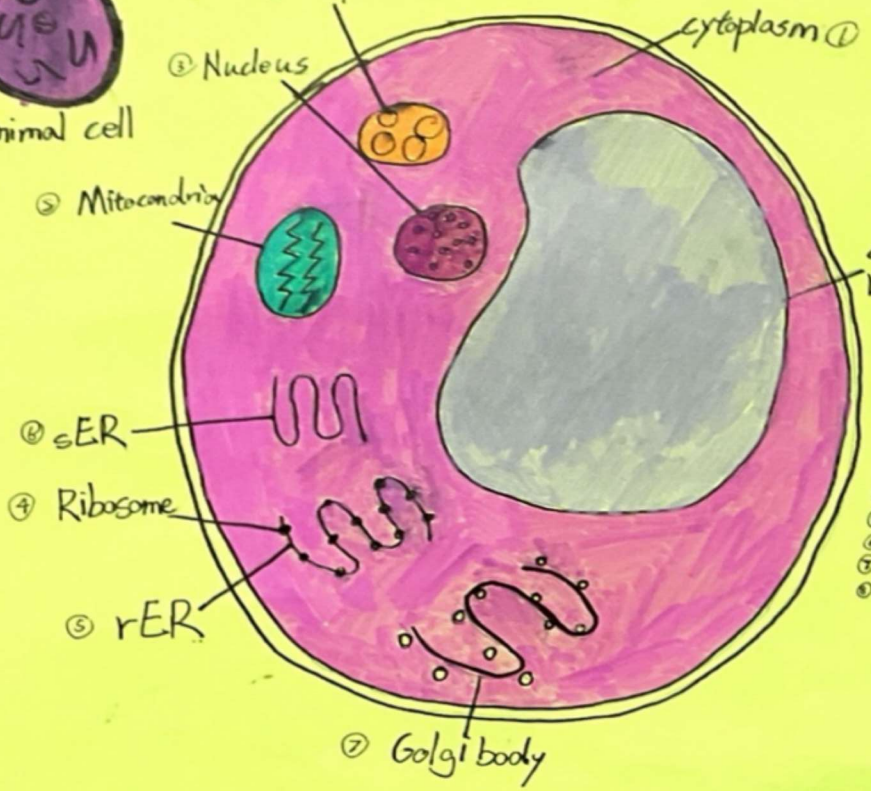
Endomembrane System & Endocytosis / Exocytosis

Kyle
Franklin
Eric
Richard

⑦ : break down wastes

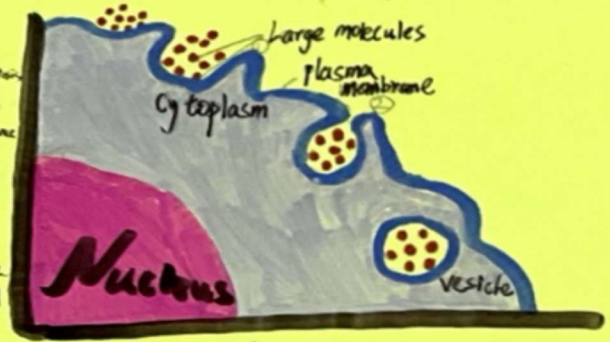


Animal cell



① : All reaction happens here
② : store water, waste, nutrients
③ : control center
④ : make protein
⑤ : modify protein
⑥ : make lipid
⑦ : modify and transport protein
⑧ : respiration to produce energy

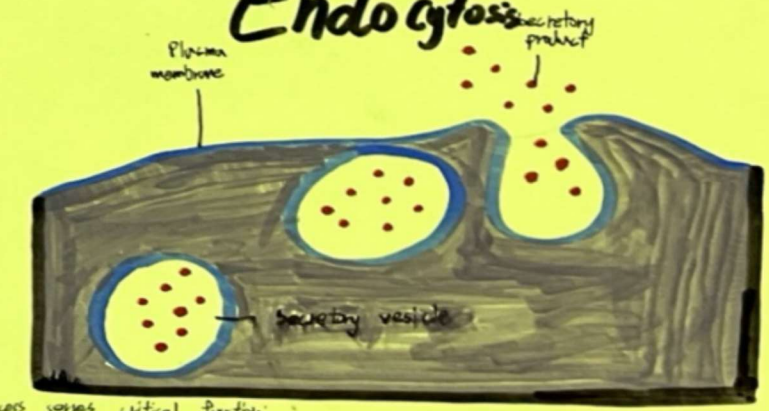
Exocytosis



The importance of exocytosis:

1. Removing waste : Cell get rid of unwanted or harmful substance
2. Secreting substances : Cells release useful materials like hormones, enzymes and neurotrasmitters.
3. Cell ~~get~~ communication: Allow cell use exocytosis to send signals to other cells.
4. Cell membrane grow and repair : It adds new membrane material helping the cell maintain it's shape and heal damage.

Endocytosis



This process serves critical function.

- Nutrient Uptake: Bringing essential nutrients into the cell
- Cell signalling : Regulating the number of receptor proteins on the cell surface
- Immune Defense : White blood cells use endocytosis to engulf and destory pathogens
- Maintaining cell Integrity: Removing damaged proteins and recycling components of the plasma membrane

CELL STRUCTURE

Remy Oscar MMP

All living things are made up of cells – the basic units of life.
There are three main types of cells: animal, plant and bacterial cells.
Each has unique structures, but all perform essential life processes.

Animal Cell

Description:
Animal cells are eukaryotic cells, meaning they have a true nucleus and membrane-bound organelles. They do not have a cell wall or chloroplasts

Smooth endoplasmic reticulum

nucleus
Controls the cell's activities and contains DNA

mitochondria The "powerhouse" that produces energy.

rough endoplasmic reticulum Transports materials

lysosome Breaks down waste and old cell parts

cytoplasm Jelly-like fluid where reactions happen

ribosomes Make proteins

cell membrane Controls what enters and leaves the cell

Golgi Body Packages and sends proteins

MAIN STRUCTURE

FUN FACT

Mitochondria and chloroplasts have their own DNA – they were once free-living bacteria!!!

Some bacteria glow in the dark!!

Plant Cell

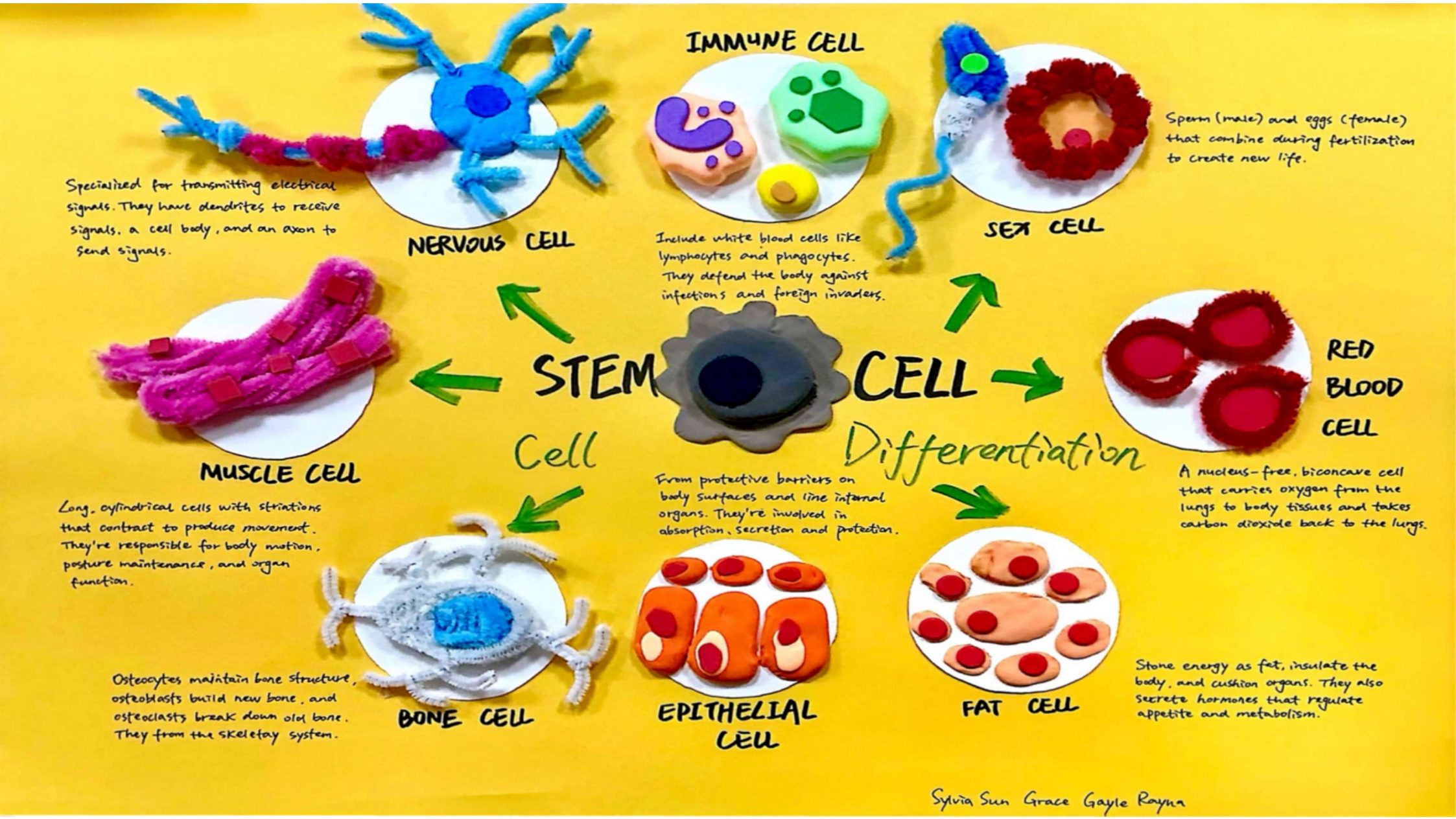
Description:
Plant cells are also eukaryotic, but they have extra structures that support photosynthesis and structure.

1. nucleus
2. RER
3. mitochondrion
4. chloroplast
5. SER
6. vacuole
7. Golgi Body
8. Cell Wall
9. Cell membrane
10. ribosome

BACTERIAL CELL

Description:
Bacteria are prokaryotic cells – simpler and smaller, without a true nucleus or membrane-bound organelles.

BIG


IMMUNE CELL
Specialized for transmitting electrical signals. They have dendrites to receive signals, a cell body, and an axon to send signals.
NERVOUS CELL
Include white blood cells like lymphocytes and phagocytes. They defend the body against infections and foreign invaders.
Sperm (male) and eggs (female) that combine during fertilization to create new life.
SEX CELL
STEM CELL
Cell Differentiation
MUSCLE CELL
Long, cylindrical cells with striations that contract to produce movement. They're responsible for body motion, posture maintenance, and organ function.
From protective barriers on body surfaces and line internal organs. They're involved in absorption, secretion and protection.
RED BLOOD CELL
A nucleus-free, biconcave cell that carries oxygen from the lungs to body tissues and takes carbon dioxide back to the lungs.
Osteocytes maintain bone structure, osteoblasts build new bone, and osteoclasts break down old bone. They from the skeletay system.
BONE CELL
EPITHELIAL CELL
FAT CELL
Stone energy as fat, insulate the body, and cushion organs. They also secrete hormones that regulate appetite and metabolism.
Sylvia Sun Grace Gayle Rayna

Water And Life

Physical properties

1. Boiling and Freezing Points
   - Boiling point: 100°C
   - Freezing point: 0°C (under 1 atmosphere of pressure)

These high values are due to hydrogen bonds, which require extra energy to break.

2. High specific heat:
   - Water can absorb or release large amounts of heat without big temperature changes.
   - This helps stabilize environments and body temperature.

3. Density
   - The density of water is 1 g/cm³ at 4°C
   - Ice is less dense than liquid water because the hydrogen bonds form a crystalline structure with more space between molecules
   - That's why ice floats.

4. Universal Solvent:
   - Because water is polar, it can dissolve many substances (especially ionic and polar molecules).
   - This property is essential to biological reactions and transport in living things.

5. Other properties:
   - Colorless, odorless and tasteless

Structure

Water (H_2O) is a polar molecule. This means one side of the molecule has a slight positive charge and the other side has a slight negative charge.

- The oxygen atom is more electronegative than hydrogen. so it pulls the shared electrons closer to itself.
- As a result, the oxygen becomes slightly negative ($\delta-$), and the hydrogens become slightly positive ($\delta+$).
- The water molecule has a bent shape (about 105°), which helps create this polarity.

Chemical properties

Cohesion:

Cohesion is the attraction between water molecules due to hydrogen bonding.

- It creates surface tension, which allows small insects to walk on water or droplets to form.
- This happens because the molecules at the surface stick tightly together, forming a thin "film."

Adhesion:

Adhesion is the attraction between water molecules and other materials.

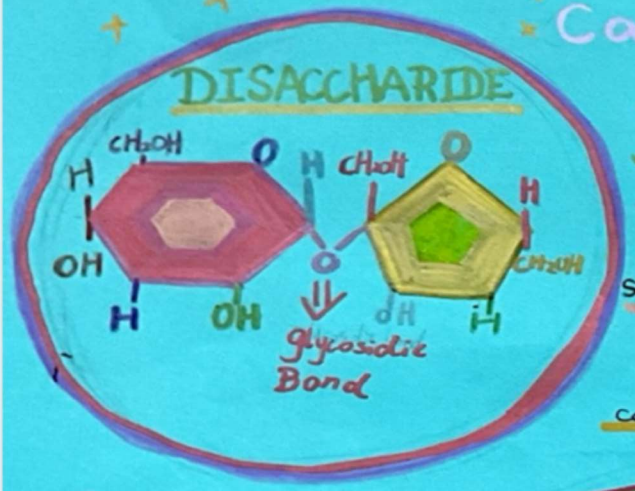
- It Allows water to climb up narrow tubes (like plant stems) through capillary action.
- Cohesion and adhesion work together to move water through plants.

Linda Donald SylviaC Fional

MACROMOLECULES

Carbonhydrate

- C, H, O
- provide energy
- monomer: glucose



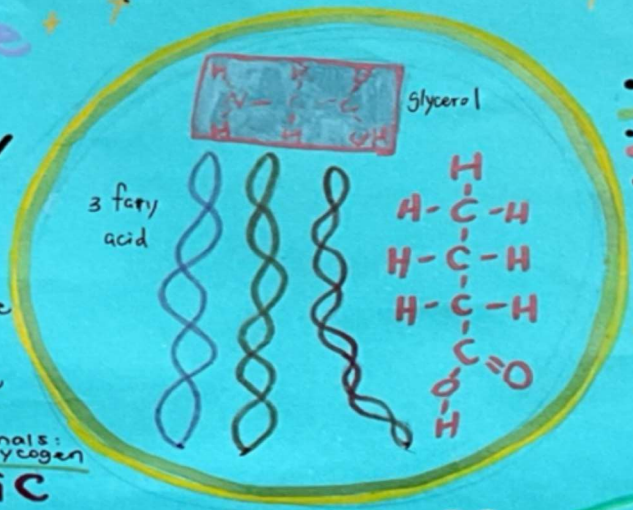
Simple sugar
- monosaccharide
  - eg. Glucose, fructose
- disaccharide
  - eg. Sucrose, Lactose

Complex Sugar : polysaccharide
- plant: Starch, cellulose
- animals: glycogen

lipid

- C, H, O
- Store energy
- monomer: 1 glycerol + 3 fatty acid

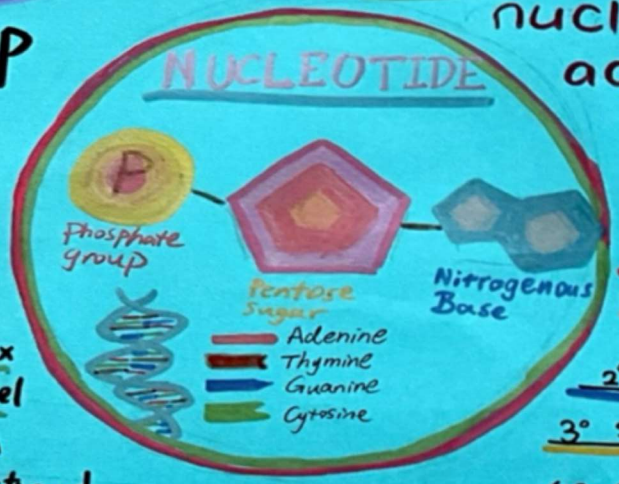
Fat: solid (roomT), animal
Oil: liquid (roomT), plant



nucleic acid

- C, H, O, N, P
- carry genetic information
- monomer: nucleotide

1. structure of DNA
   - double-helix
   - anti parallel
2. structure of RNA
   - single strand.



protein

- C, H, O, N[S]
- (1) movement
- (2) structure
- (3) immune
- (4) ↑reaction
- monomer: amino acid

1° structure: amino acid sequence (dehydration synthesis)

2° structure: α-helix, β sheet

3° structure: R group - polar - hydrophilic; non-polar - hydrophobic

4° structure: (hydrogen bond)