Food

→ **Why organisms need food:**
- To provide energy
- To make chemicals needed for chemical reactions
- For growth and repair of structures in the organism

→ **Elements in Food:**
- 6 chemical elements:
  - → Carbon
  - → Hydrogen
  - → Oxygen
  - → Phosphorus
  - → Sulfur
  - → Nitrogen
- Salts of:
  - → Sodium
  - → Magnesium
  - → Chlorine
  - → Potassium
  - → Calcium
- 3 Trace elements:
  - → Iron
  - → Copper
  - → Zinc

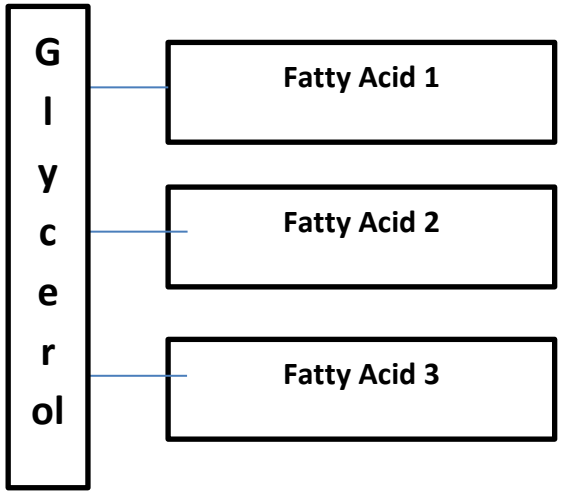
→ **Biomolecules:** Chemicals that are made inside a living thing.
- The 4 main types found in food are carbohydrates, lipids, proteins and vitamins

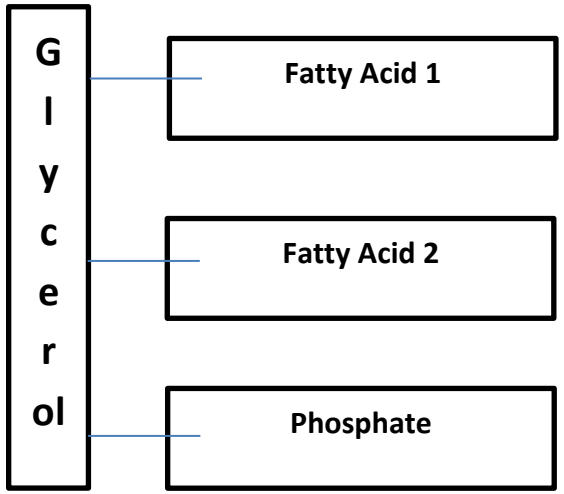
→ **Carbohydrates:**
- Contain the elements carbon, oxygen and hydrogen
- Ratio: C$x(H2O)y$ (x =y)
- There are 3 types of carbohydrates
  - → Monosaccharides
    - Composed of 1 sugar unit
    - Soluble in water
    - Sweet to taste
    - Eg. Glucose, Fructose
  - → Disaccharide:
    - Composed of 2 sugar units
    - Soluble in water
    - Sweet to taste
    - Eg. Maltose, sucrose
  - → Polysaccharide:
    - Composed of many sugar units
    - Not soluble in water
    - Not sweet
    - Eg. Starch, Cellulose
- Structural role : Cellulose forms plant cell walls
- Metabolic role: Glucose is made in photosynthesis
- Test for reducing sugar- benedict's solution:
  - → If present: blue ⟶ red
  - → If not present: stays blue
  - → Heat required
- Test for starch- Iodine:
  - → If present: red/yellow ⟶ blue/black
  - → If not present: stays red/yellow

→ **Lipids:**

- Contain the elements carbon, Hydrogen and Oxygen (have no simple ratio)
- Fats: lipids that are liquid at room temperature
- Oils: lipids that are liquid at room temperature
- Structure:
- Structural role:

  - Triglyceride: Contains 1 molecule of glycerol and 3 fatty acid molecules
  - Phospholipids: Contains 1 molecule of glycerol, 2 fatty acid molecules and 1 molecule of phosphate
- Structural role:
  - Provide energy
  - Store energy
  - Phospholipids form part of cell membrane
- Metabolic role:
  - Broken down in respirations to release energy
- Test:
  - Turns brown paper translucent





→ **Proteins:**

- Contain carbon, hydrogen, oxygen, and nitrogen
- The elements combine to form amino acids- (20 common amino acids are found in proteins)
- Amino acids combine to form peptide bonds (less than 20) or polypeptide bonds (more than 20)
- Structural role:
  - Keratin is found in skin, hair and nails
- Metabolic role:
  - Enzymes control reactions
  - Antibodies fight infection
- Test: Biuret solution:
  - If present: blue → purple
  - If not present: stays blue

→ **Vitamins**

- Vitamin C:
  - Water soluble
  - Sources: citrus fruit

        - Metabolic role: formation of connective tissue and growth and maintenance of bones and teeth
        - Deficiency: scurvy
    - Vitamin D:
        - Fat soluble
        - Sources: fish oils, milk
        - Metabolic role: absorb calcium from intestine
        - Deficiency: rickets

→ **Minerals:**

- Plants
    - Calcium: to make cell walls
    - Magnesium: to make chlorophyll
- Animals:
    - Calcium: to form rigid body structure, e.g. bones
    - Iron: to make haemoglobin

→ **Water**

- Component of cytoplasm
- Good solvent- dissolves minerals
- Transport medium
- Used in chemical reactions e.g. respiration
- High heat capacity: Good absorber of heat- difficult to warm up or cool down. Organisms living in/composed of water have stable body temperature

→ **Energy transfer:**

- Anabolic reactions: use energy to convert smaller molecules to larger one, e.g. Photosynthesis

- Catabolic reactions: release energy he n a complex molecule is broken down to a simpler form, e.g. respiration