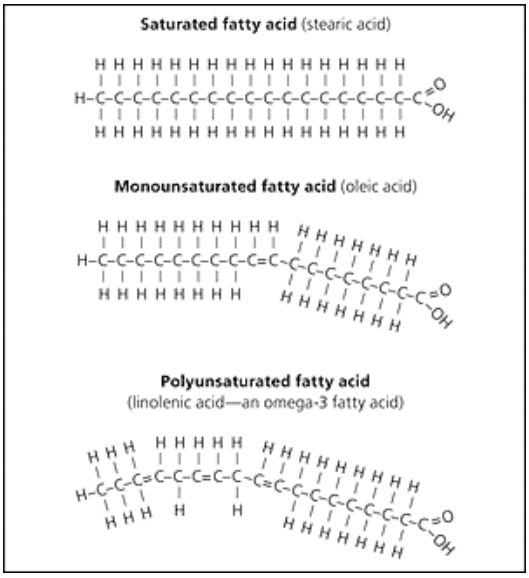
- Insulation – lipids slow conductors of heat

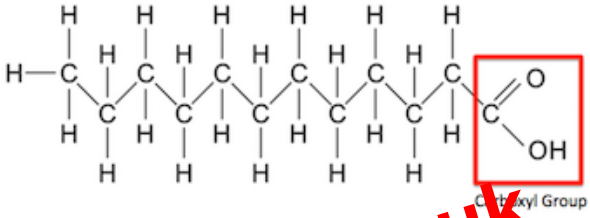


Properties of lipids

- Hydrocarbon based
- Lower proportion of O relative to C and H than in carbohydrates
- They're insoluble to water
- They are soluble in organic solvents like acetone, alcohols

Saturated fats are solids at room temp, unsaturated are liquids due to not being able to pack together because of double bonds.

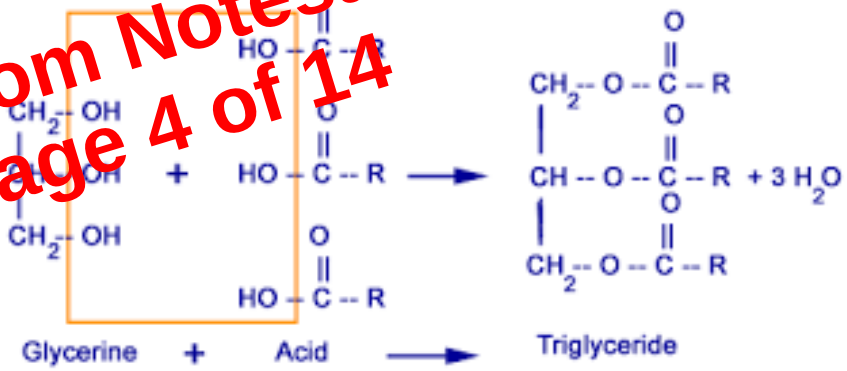
All saturated and unsaturated chains end in a carboxyl group



Bond making – Esterification

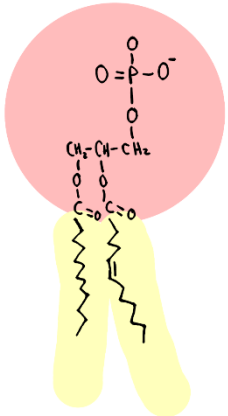
When a carboxyl group reacts with a OH in a condensation reaction creating an Ester bond between alcohols and lipids

Esterification is a condensation reaction, so water is produced from it. The reaction does not create a polymer, the fatty acid and glycerol are different molecules



Phospholipids

A phospholipid is made of glycerol and two fatty acids. The third binding site is taken by a phosphate group instead of a third fatty acid.



Fatty acids have no charge and are non-polar = hydrophobic

- This means it orients itself away from water (but mixes with fats/triglycerides)

Phosphate group have +ve/-ve charges and are thus polar = hydrophilic

- Attracted to water, but not fat

Cation	Anion
Iron – essential nutrient Toxicant to cells Regulation of cell growth Binding, transport of oxygen Gene regulation Electron transfer reactions	Chloride – move out of cells lining in lungs and digestive system to provide a low water potential outside cell.
Sodium – certain metabolic functions Major extra cellular action Sodium used as nutrients generally used for maintenance of electrolyte and fluid balance.	Phosphate – used in production of nucleic acids production of ATP and phospholipids which are essential in cell membranes.
Potassium – important transmission in nerve impulses Constantly pumped into cells through active transport in exchange for sodium	
Hydrogen – pH is calculated based on concentration of hydrogen ions. More H+ means lower pH and more acidic Enzyme controlled reactions affected by pH	
Calcium – required blood clotting in mammals Calcium phosphate provides hard, strong, insoluble matrix in bones and teeth in mammals Involved in transmission of action potentials for one neurone to another in muscle contraction	