• Amino group: -NH2 (amines) related to ammonia (-NH3) and act as base accepting a proton to form -N3+
  o Hydrophobic and reactive and hydrogens can be replaced by other groups
• Carbonyl group: -C=O one of the most important and reactive groups
  o Hydrophilic
  o Adehydes –CHO
    ▪ CH3 – C –H
      • =0
  o Ketones
    ▪ CH3 – C –CH3
      • =0
• Carboxylic acid group: -COOH
  o –OH can ionize making compounds containing this group weak acids
  o Krebs cycle (tricarboxylic acid cycle) is a cycle of cellular reactions involving a number of carboxylic acids
• Sulphydryl groups: -SH
  o H atom can be removed easily
  o In proteins 2-SH groups may become oxidized to form a cross link structure –S-S–
• Several functional groups in 1 molecule:
  o Alpha- amino acids (building blocks of proteins)
    ▪ Contains both –COOH and –NH2 but at neutral pH an amino acid is best written +H3N-CHR-CO2^-
  o Fatty acids contain both hydrophilic and hydrophobic groupings

Important reactions:
• Oxidation of alcohols
  o Alcohol groups may reversibly be oxidized to carbonyl group
  o An aldehyde is the oxidation product when the alcohol has at least 2 H atoms attached to the C bearing the –OH groups
    ▪ Known as the primary alcohol
    ▪ Primary alcohol → aldehyde → carboxylic acid
    ▪ If alcohol only has one H atom it will produce a ketone
• Reactions between functional groups
  o When carboxylic acid reacts with an alcohol, water is eliminated and an ester is formed
    ▪ Condensation reaction
    ▪ Reverse = hydrolysis

Organic Compounds
Carbon:
• Facilitated by its versatile valency of 4
• Ability to form long chains
  o More than one bond per atom
  o Preference for single bonds over double
    ▪ 2 single bonds is more stable than 1 double
• Oxide must not be too much more stable than the pure element
  o Would only bond to oxygen

Hydrocarbon – organic carbon compound composed of hydrogen and carbon only
• Aliphatic and aromatic

Aliphatic:
• Carbon atoms form open chains, branched chains, & non-aromatic rings

Aromatic:
• Any organic compound characterized by 1 or more planar rings each of which contains 3 conjugated double bonds and delocalized pi electrons
• Undergo substitution reactions more readily than addition reactions
• Benzene