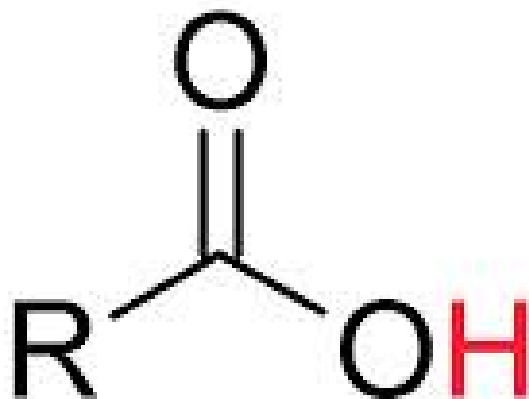


Organic Acids

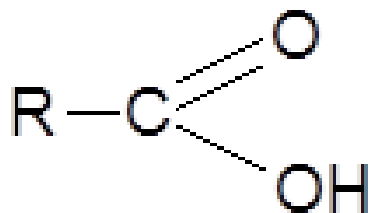


Outcome:

- Outline the transformation of alkenes to alkynes and vice versa.
- Name, Draw and construct molecular models of alkynes and branched alkynes.

Organic Acids:

- Organic acids are also known as **CARBOXYLIC** acids.
- The **FUNCTIONAL** group is made of:
 - a **CARBONYL** (**-C=O**)
 - and a **HYDROXYL** (**-OH**).
- Together they form a carboxyl group:

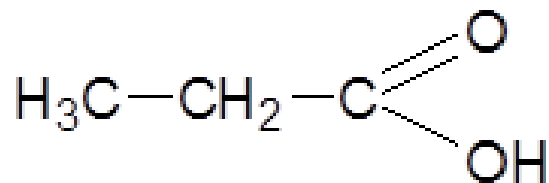


- Oxidizing a **PRIMARY ALCOHOL** can make **CARBOXYLIC** acids.

Naming Carboxylic Acids:

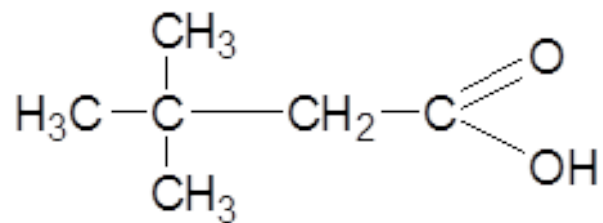
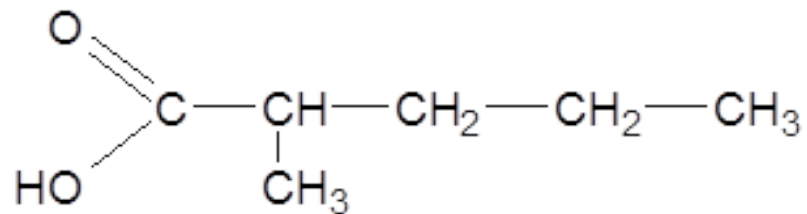
1. Name the **LONGEST CARBON CHAIN** which **CONTAINS** the carboxyl group (include the **C** atom of the carboxyl group).
2. Replace the **-E** ending with the suffix **-OIC ACID**.
3. Number the carbons starting at the **END NEAREST** the carboxyl group.
4. Number the **BRANCHES** based on their **POSITION** on the chain and list in **ALPHABETICAL** order.

Examples:



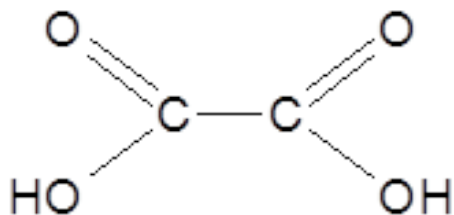
Naming Carboxylic Acids:

Examples:



Naming Carboxylic Acids:

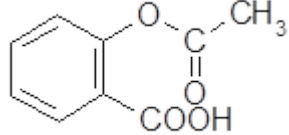
If there are TWO or MORE carboxyl groups, we use DI, TRI, TETRA, etc as before:



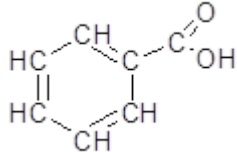
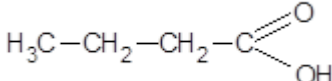
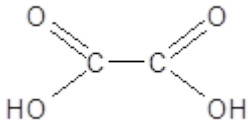
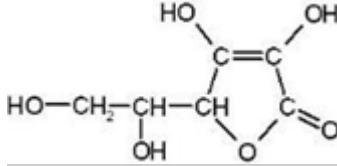
Physical Properties of Organic Acids:

- Acids, like alcohols, have HIGHER melting and boiling points than CORRESPONDING HYDROCARBONS due to STRONGER INTERMOLECULAR FORCES.
- Have a PUNGENT odour, but odour DECREASES as number of C-ATOMS increases.
- Solubility DECREASES as the chain length INCREASES
 - The carboxyl group makes the molecule POLAR, but has less effect as the chain length INCREASES.
- The CARBOXYL group is often found in FATTY ACIDS that are naturally occurring in FATS and OILS.

Common Carboxylic Acids:

Acid	Structure
Acetic acid (Ethanoic Acid) Also known as vinegar	CH_3COOH
Citric acid Found in citrus fruits (lemons/limes)	$\begin{array}{c} \text{COOH} \\ \\ \text{HO}-\text{C}-\text{CH}_2\text{COOH} \\ \\ \text{CH}_2\text{COOH} \end{array}$
Acetylsalicylic acid Active ingredient in aspirin (ASA)	
Formic acid Irritant in ant or bee stings	$\begin{array}{c} \text{HO}-\text{C}=\text{O} \\ \\ \text{H} \end{array}$
Stearic acid (octadecanoic acid) Fatty acid in animal fats used to make soaps	$\begin{array}{c} \text{HO}-\text{C}=\text{O} \\ \\ (\text{CH}_2)_{16}\text{CH}_3 \end{array}$

Common Carboxylic Acids:

Acid	Structure
<p data-bbox="363 297 620 337">Benzoic Acid</p> <p data-bbox="224 386 765 486">Used in food flavouring and preserving</p>	 <p data-bbox="1155 294 1392 444">The structure shows a six-membered benzene ring with alternating single and double bonds. One carbon atom in the ring is bonded to a carboxyl group, represented as -C(=O)OH.</p>
<p data-bbox="214 515 765 558">Butyric Acid (butanoic acid)</p> <p data-bbox="407 594 581 636">In butter</p>	 <p data-bbox="1108 572 1441 651">The structure is a linear chain of four carbon atoms. The first carbon is bonded to three hydrogen atoms (H₃C-). The second and third carbons are each bonded to two hydrogen atoms (-CH₂-). The fourth carbon is part of a carboxyl group, shown as -C(=O)OH.</p>
<p data-bbox="195 733 784 776">Oxalic Acid (ethanedioic acid)</p> <p data-bbox="200 815 790 915">Found in plants, used in wood bleaching</p>	 <p data-bbox="1141 765 1389 886">The structure consists of two carbon atoms connected by a single bond. Each carbon atom is also bonded to two oxygen atoms via double bonds and one hydroxyl group (-OH) via a single bond.</p>
<p data-bbox="355 952 625 995">Ascorbic Acid</p> <p data-bbox="191 1026 799 1126">AKA Vitamin C. Found in citrus fruits/tomatoes</p>	 <p data-bbox="1103 955 1441 1119">The structure shows a five-membered lactone ring (a ring with one oxygen atom and one carbonyl group). Two hydroxyl groups are attached to the two carbons of the double bond in the ring. A side chain is attached to one of the ring carbons, consisting of a -CH(OH)-CH₂-OH group.</p>