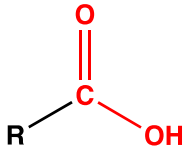


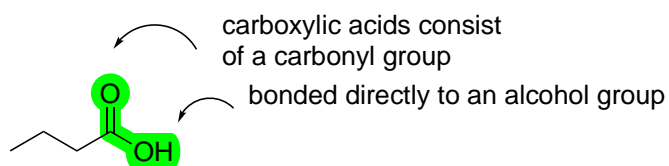
Carboxylic Acids

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Butanoic acid	122
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Summary

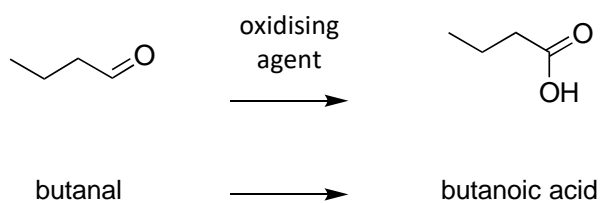
Functional group	General formula	Structure/example	Prefix	Suffix
Carboxylic acid	-COOH		carboxy-	-oic acid



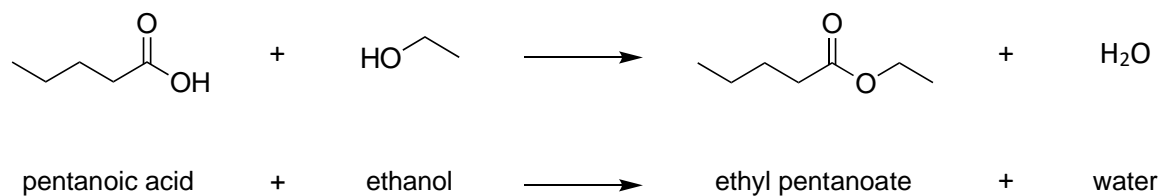
-COOH must be on the terminal position. Thus the *-1-* locant can be dropped from the name in most cases.

Selected Reactions

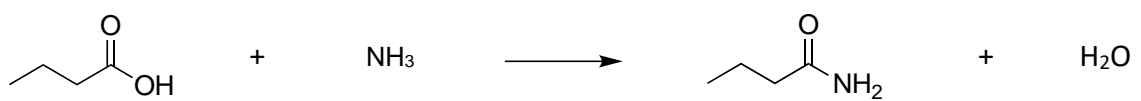
Carboxylic acids are formed from oxidation of aldehydes:



Carboxylic acids combine with alcohols to make esters:



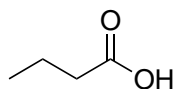
Carboxylic acids combine with amines to make amides:



butanoic acid + ammonia \longrightarrow butanamide + water

Worked Examples

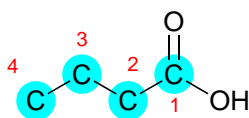
Butanoic acid



STEP 1: Identify the parent hydrocarbon chain

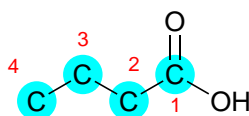
1.1 It should have the functional group with the highest priority

1.2 It should have the maximum length



- Functional group ✓
- Longest chain ✓

STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix.

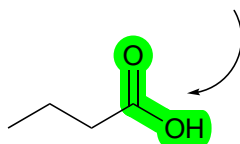


4 C = **BUT**

ALKANE = **-AN-**

STEP 3: Identify the functional group with the highest priority and its suffix

CARBOXYLIC ACID = **-OIC ACID**



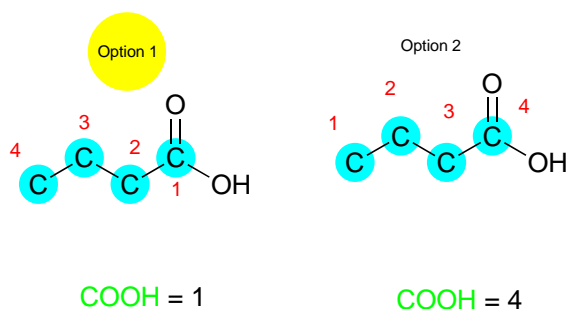
STEP 4: Identify side chains. Count the number of carbons and identify their prefix and suffix

None

STEP 5: Identify any remaining functional groups (including double and triple bonds) and their suffixes

None

STEP 6: Number the parent hydrocarbon chain from the end that produces the lowest set of locants for, in order of precedence, functional groups, double and triple bonds and side chains



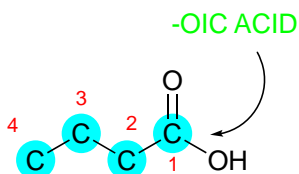
Lowest locants possible ✓

STEP 7: Numbers indicating the locant of the functional group are placed directly before the functional group portion of the name.

7.1 Names are listed alphabetically

7.2 If there is more than one of the same functional group, the prefix di- (2), tri- (3), tetra- (4) are used. These are not considered for alphabetical listing

7.3 If the functional group is in a position where no alternative position is possible, no number is required (e.g. ethan-1-ol should be written as ethanol)



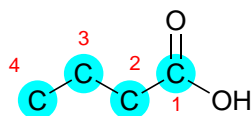
-COOH must be on the first or last position.
Thus the -1- locant can be dropped from the name.

STEP 8: Write the complete name

8.1 Commas are written between numbers

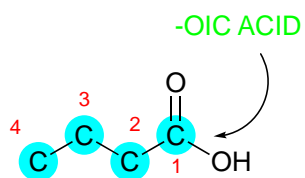
8.2 Hyphens are written between numbers and letters

8.3 Successive words are combined into one word

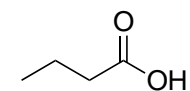


4 C = BUT
ALKANE = -AN-

Steps 1,2



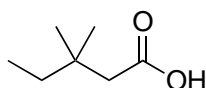
Steps 3,6,7



butanoic acid

Step 8

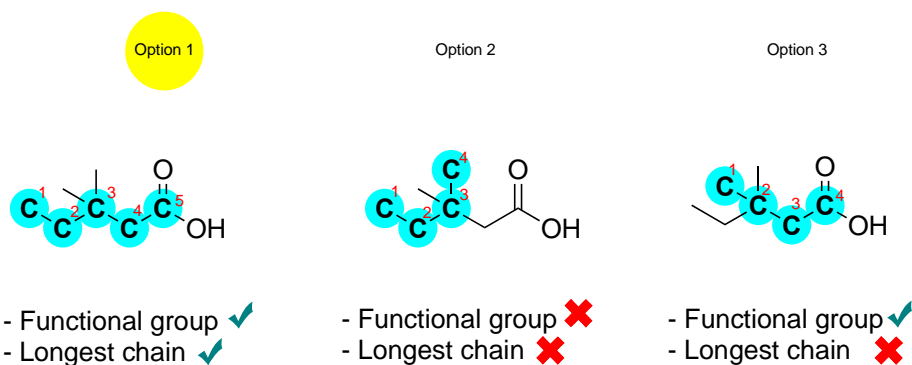
3,3-dimethylpentanoic acid



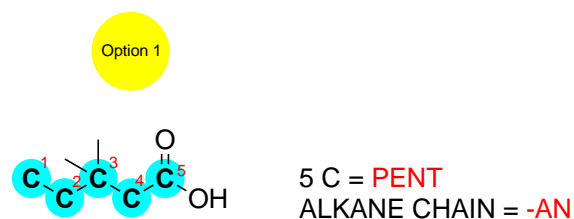
STEP 1: Identify the parent hydrocarbon chain

1.1 It should have the functional group with the highest priority

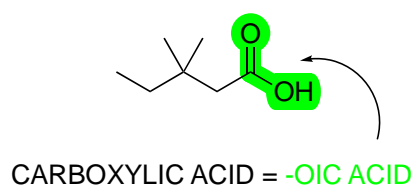
1.2 It should have the maximum length



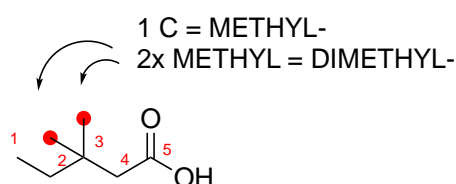
STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix.



STEP 3: Identify the functional group with the highest priority and its suffix



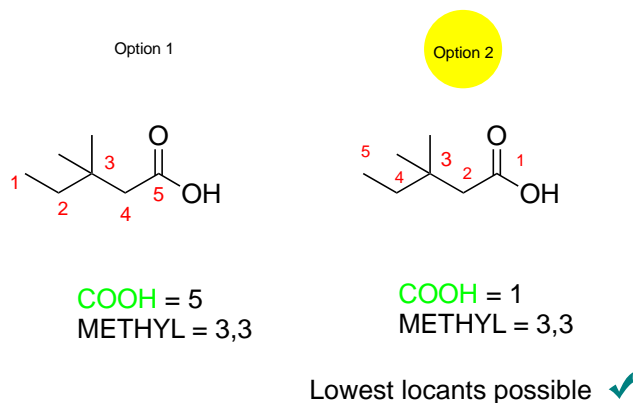
STEP 4: Identify side chains. Count the number of carbons and identify their prefix and suffix



STEP 5: Identify any remaining functional groups (including double and triple bonds) and their suffixes

None

STEP 6: Number the parent hydrocarbon chain from the end that produces the lowest set of locants for, in order of precedence, functional groups, double and triple bonds and side chains



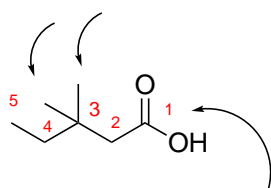
STEP 7: Numbers indicating the locant of the functional group are placed directly before the functional group portion of the name.

7.1 Names are listed alphabetically

7.2 If there is more than one of the same functional group, the prefix di- (2), tri- (3), tetra- (4) are used. These are not considered for alphabetical listing

7.3 If the functional group is in a position where no alternative position is possible, no number is required (e.g. ethan-1-ol should be written as ethanol)

3,3-DIMETHYL



-1-OIC ACID

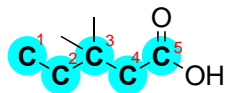
COOH always on terminal group
The 1 locant can be dropped

STEP 8: Write the complete name

8.1 Commas are written between numbers

8.2 Hyphens are written between numbers and letters

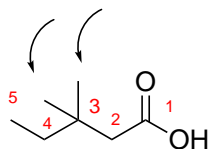
8.3 Successive words are combined into one word



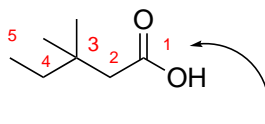
5 C = **PENT**
ALKANE = **-AN**

Steps 1,2

3,3-DIMETHYL



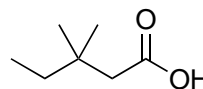
Steps 4,6,7



-OIC ACID

COOH always on terminal group
The 1 locant can be dropped

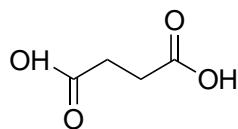
Steps 3,6,7



3,3-dimethyl**pentanoic acid**

Step 8

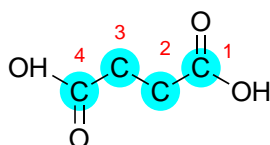
Butandioic acid



STEP 1: Identify the parent hydrocarbon chain

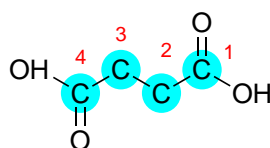
1.1 It should have the functional group with the highest priority

1.2 It should have the maximum length



- Functional group ✓
- Longest chain ✓

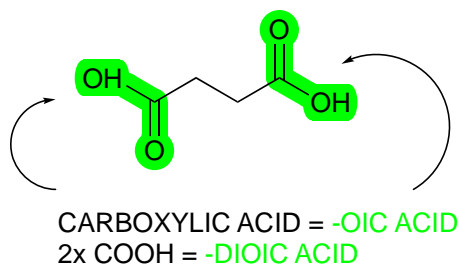
STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix



4 C = **BUT**

ALKANE = **-AN-**

STEP 3: Identify the functional group with the highest priority and its suffix



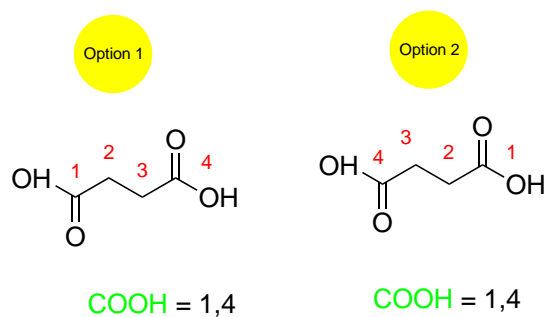
STEP 4: Identify side chains. Count the number of carbons and identify their prefix and suffix

None

STEP 5: Identify any remaining functional groups (including double and triple bonds) and their suffixes

None

STEP 6: Number the parent hydrocarbon chain from the end that produces the lowest set of locants for, in order of precedence, functional groups, double and triple bonds and side chains



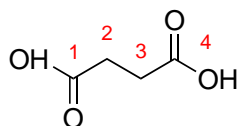
Lowest locants possible ✓

STEP 7: Numbers indicating the locant of the functional group are placed directly before the functional group portion of the name.

7.1 Names are listed alphabetically

7.2 If there is more than one of the same functional group, the prefix di- (2), tri- (3), tetra- (4) are used. These are not considered for alphabetical listing

7.3 If the functional group is in a position where no alternative position is possible, no number is required (e.g. ethan-1-ol should be written as ethanol)



-COOH must be on the first or last position.

Thus the -1,4- locant can be dropped from the name.

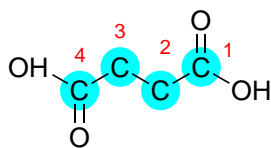
COOH = -DIOIC ACID

STEP 8: Write the complete name.

8.1 Commas are written between numbers

8.2 Hyphens are written between numbers and letters

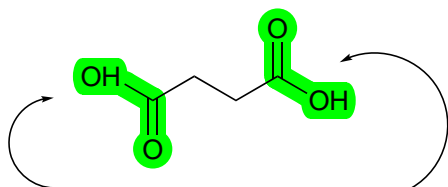
8.3 Successive words are combined into one word



4 C = **BUT**

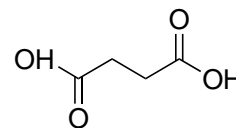
ALKANE = **-AN-**

Steps 1,2



CARBOXYLIC ACID = **-OIC ACID**
2x COOH = **-DIOIC ACID**

Steps 3,6,7



butandioic acid

Step 8