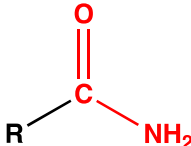


Amides

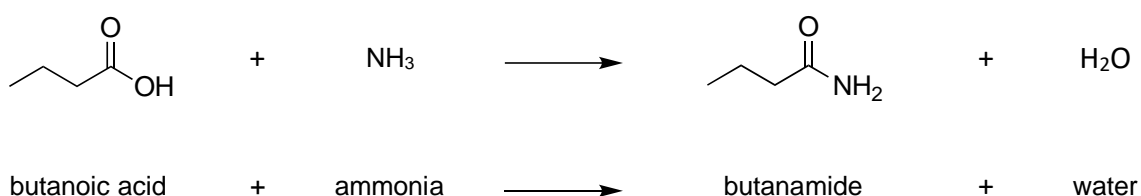
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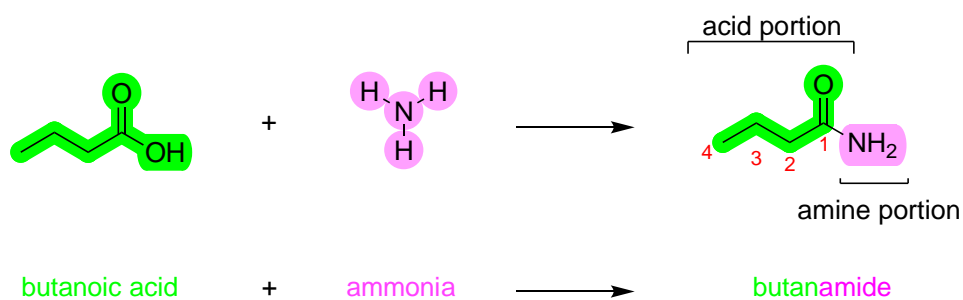
Summary

Functional group	General formula	Structure/example	Prefix	Suffix
Amide	-CONH ₂		amido-	-amide

Carboxylic acids combine with amines to make amides:



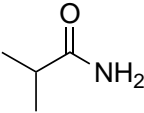
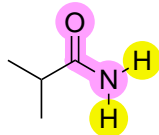
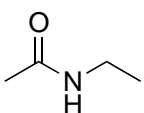
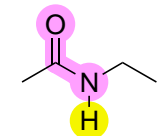
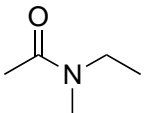
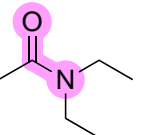
Thus we can refer to the acid and amine portion of amides:



As the carboxylic acid portion of the molecule has the highest priority, this portion always determines the parent chain. This distinction is relevant when naming secondary and tertiary amines.

Primary, Secondary and Tertiary Amides

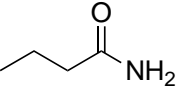
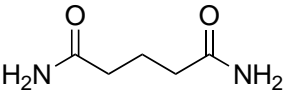
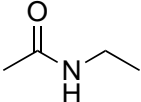
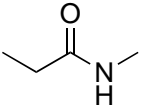
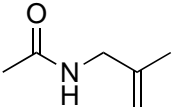
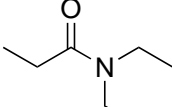
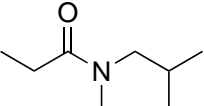
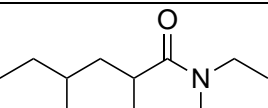
Similarly to amines, amides can be classified as primary, secondary or tertiary amides. This classification relies on the **nitrogen atom** and the number of hydrogen atoms bonded directly to the nitrogen.

Configuration	Description	Example (Skeletal)	Example (Amide configuration)
Primary amide	The nitrogen has two or more hydrogen atoms bonded directly to it.		 2x Hydrogen atoms attached directly to Nitrogen
Secondary amide	The nitrogen has one hydrogen atom bonded directly to it.		 1x Hydrogen atom attached directly to Nitrogen
Tertiary amide	The nitrogen has no hydrogen atoms bonded directly to it.		 No Hydrogen atoms attached directly to Nitrogen

There are special naming conventions that need to be used for secondary and tertiary amides.

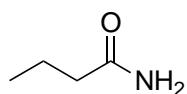
Primary amides follow similar naming conventions to other functional groups.

Secondary and tertiary amides use an italicised '*N*-' to locate the side chains in relation to the amide group. Secondary amines contain a single *N*- in their name, whereas tertiary amides contain two *N*- parts.

Configuration	Example (Skeletal)	IUPAC name
Primary amide		butanamide
		pentan-1,5-diamide
Secondary amide		<i>N</i> -ethylethanamide
		<i>N</i> -methylpropanamide
		<i>N</i> -(2-methylprop-2-enyl)ethanamide
Tertiary amide		<i>N,N</i> -diethylpropanamide
		<i>N</i> -ethyl- <i>N</i> -(2-methylpropyl)propanamide
		<i>N,N</i> -diethyl-2,4-dimethylhexanamide

Worked Examples – Primary Amides

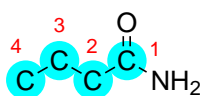
Butanamide



STEP 1: Identify the parent hydrocarbon chain

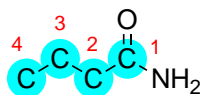
- 1.1 It should have the functional group with the highest priority
- 1.2 It should have the maximum length

Option 1



- Functional group ✓
- Longest chain ✓

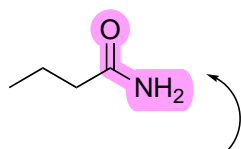
STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix



4 C = **BUT**

ALKANE = **-AN**

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



AMIDO = **-AMIDE**

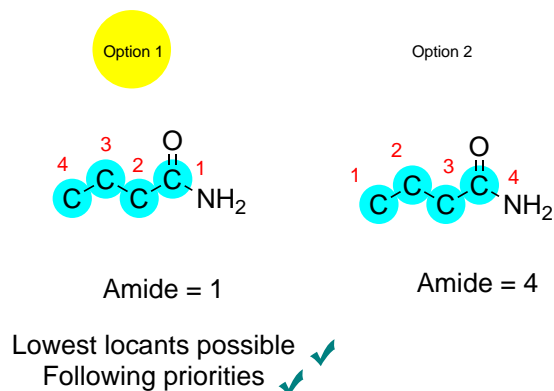
STEP 4: Identify side chains. Count the number of carbons and identify their prefix and suffixes

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

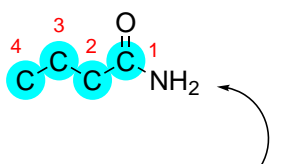


STEP 7: Numbers indicating the locant of the functional group are placed directly before the functional group portion of the name.

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)



-AMIDE

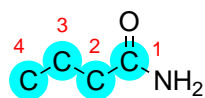
Note amide is on the 1st position.
The -1- can be dropped from the name.

STEP 8: Write the complete name

8.1 Commas are written between numbers

8.2 Hyphens are written between numbers and letters

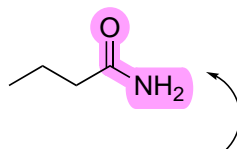
8.3 Successive words are combined into one word



4 C = **BUT**

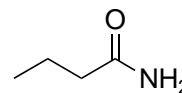
ALKANE = **-AN**

Steps 1,2



AMIDO = **-AMIDE**

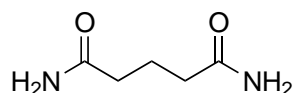
Steps 3,6,7



butanamide

Step 8

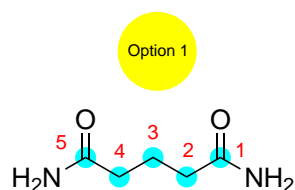
Pentan-1,5-diamide



STEP 1: Identify the parent hydrocarbon chain

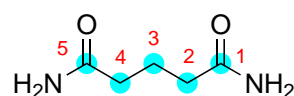
1.1 It should have the functional group with the highest priority

1.2 It should have the maximum length



- Functional group ✓
- Longest chain ✓

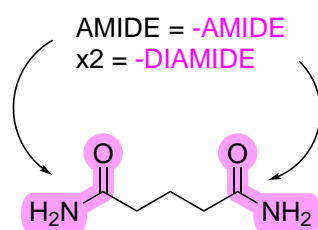
STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix



5 C = PENT

ALKANE = -AN

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



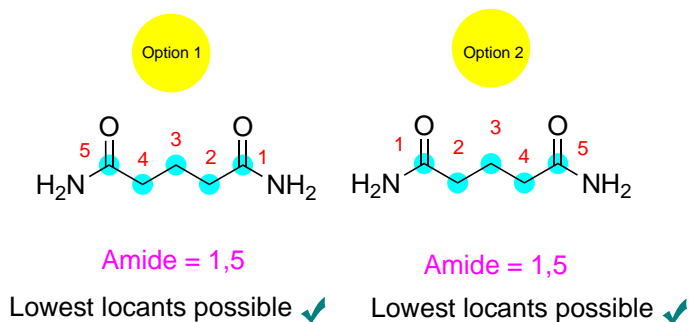
STEP 4: Identify side chains. Count the number of carbons and identify their prefix and suffixes

None

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

None

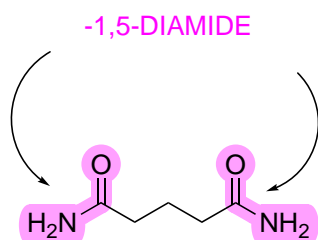
STEP 6: Number the parent hydrocarbon chain from the end that produces the lowest set of locants for, in order of precedence, functional groups, double and triple bonds and side chains



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

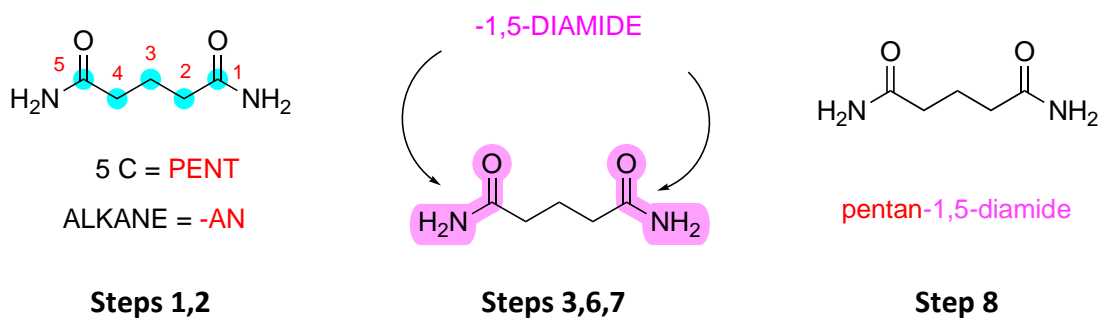


STEP 8: Write the complete name

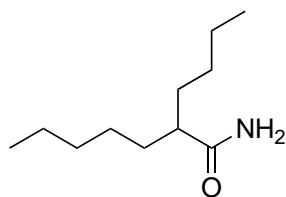
8.1 Commas are written between numbers

8.2 Hyphens are written between numbers and letters

8.3 Successive words are combined into one word



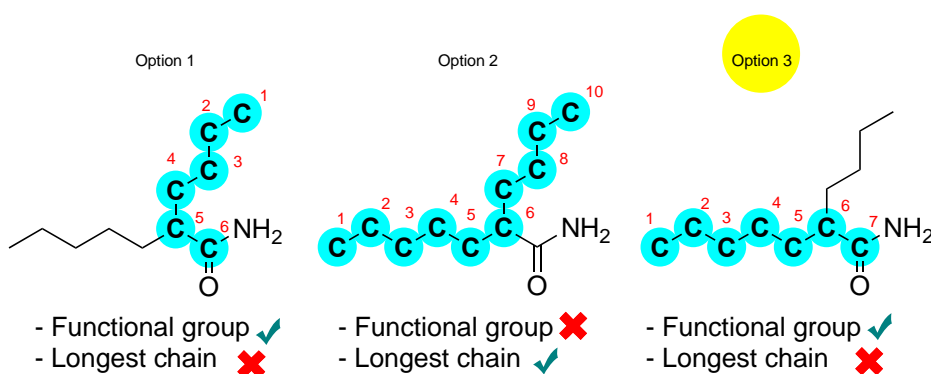
2-butylheptanamide



STEP 1: Identify the parent hydrocarbon chain

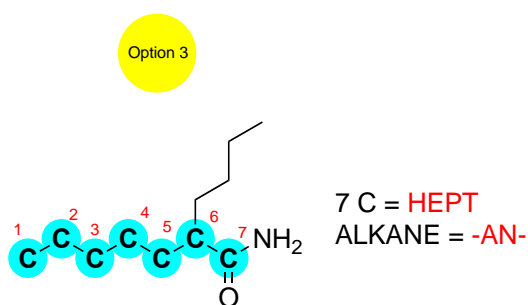
1.1 It should have the functional group with the highest priority

1.2 It should have the maximum length

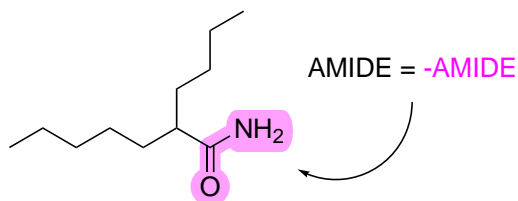


Functional group takes precedence over Longest chain

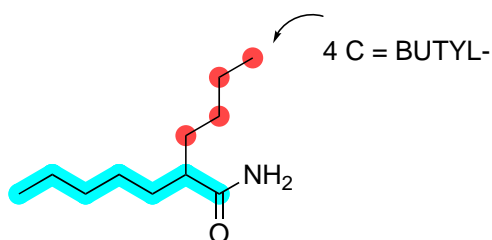
STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix



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



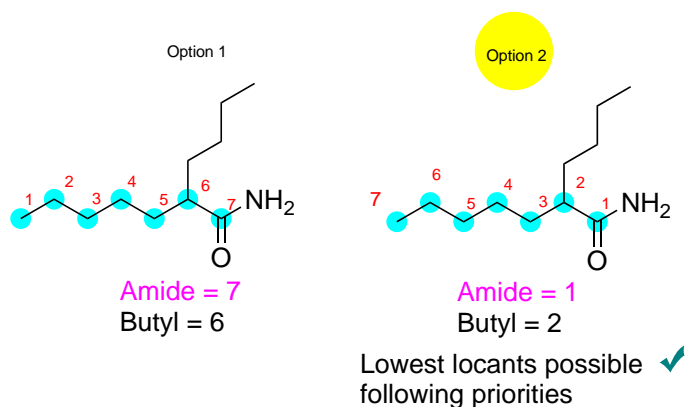
STEP 4: Identify side chains. Count the number of carbons and identify their prefix and suffixes



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

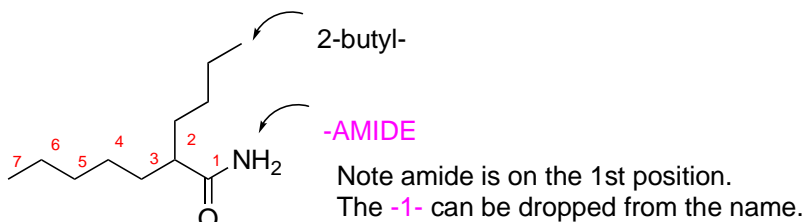


STEP 7: Numbers indicating the locant of the functional group are placed directly before the functional group portion of the name.

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)

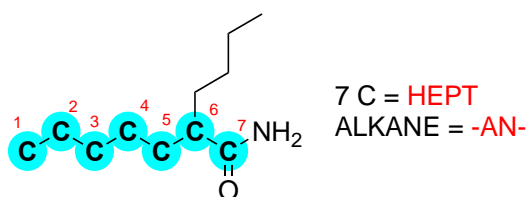


STEP 8: Write the complete name

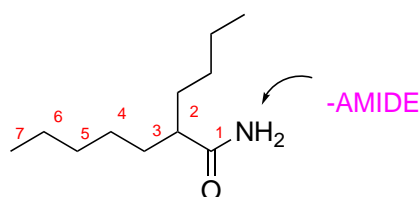
8.1 Commas are written between numbers

8.2 Hyphens are written between numbers and letters

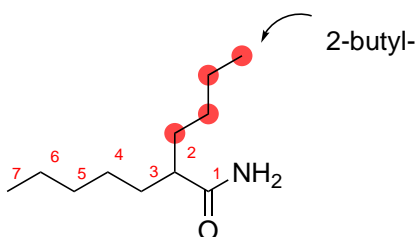
8.3 Successive words are combined into one word



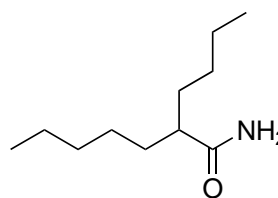
Steps 1,2



Steps 3,6,7

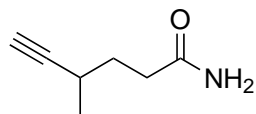


Steps 4,6,7



Step 8

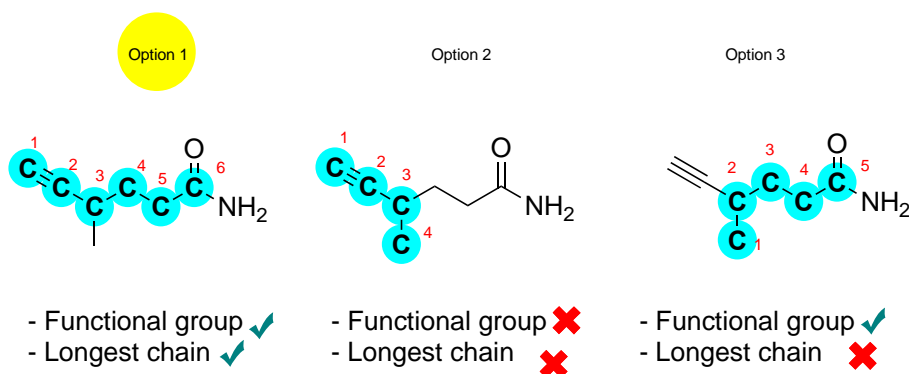
4-methylhex-5-ynamide



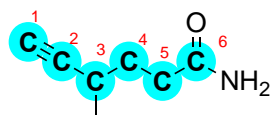
STEP 1: Identify the parent hydrocarbon chain

1.1 It should have the functional group with the highest priority¹

1.2 It should have the maximum length

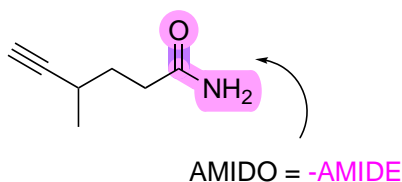


STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix



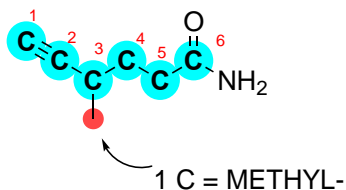
6 C = **HEX**

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

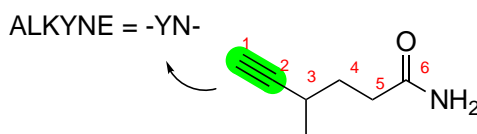


¹ The most recent IUPAC Blue Book release does not consider alkyne substituents when determining the parent chain. However, in this example, the new rules will not alter the nomenclature (the alkyne is in the longest chain).

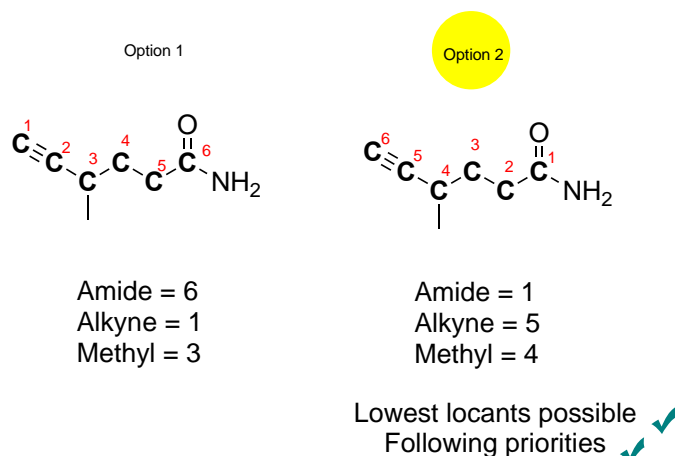
STEP 4: Identify side chains. Count the number of carbons and identify their prefix and suffixes



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



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

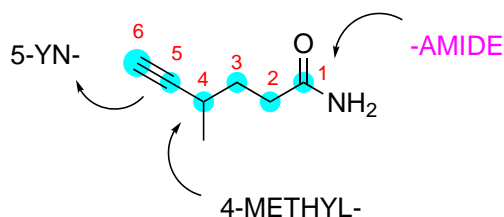


STEP 7: Numbers indicating the locant of the functional group are placed directly before the functional group portion of the name.

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)

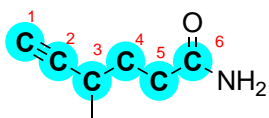


STEP 8: Write the complete name

8.1 Commas are written between numbers

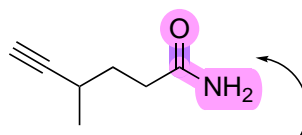
8.2 Hyphens are written between numbers and letters

8.3 Successive words are combined into one word



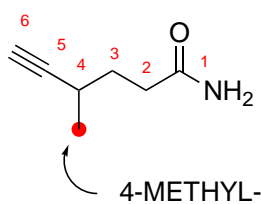
6 C = **HEX**

Steps 1,2



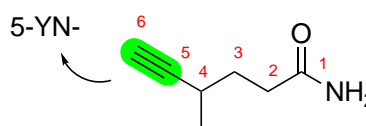
-AMIDE

Steps 3,6,7



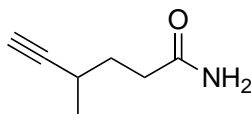
4-METHYL-

Steps 4,6,7



5-YN-

Steps 5,6,7

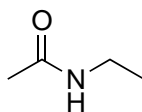


4-methyl**hex**-5-yn**amide**

Step 8

Worked Examples – Secondary Amides

N-ethylethanamide

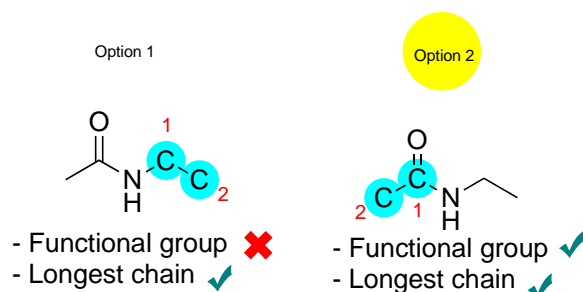


STEP 1: Identify the parent hydrocarbon chain

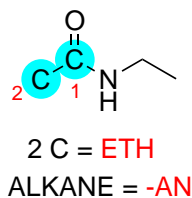
1.1 It should have the functional group with the highest priority

1.2 It should have the maximum length

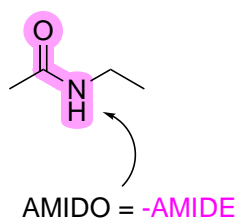
As the carboxylic acid portion of the molecule has the highest priority, this portion always determines the parent chain.



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

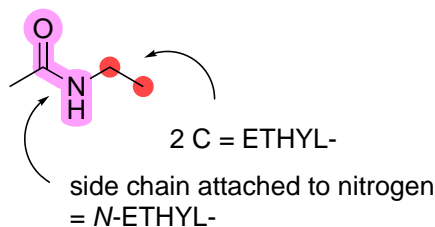


STEP 3: Identify the functional group with the highest priority and its suffix



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

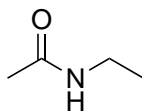
As the amine portion of the molecule has the second priority, this portion is considered a side chain.



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

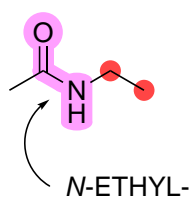
None

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



Side chain located by N-, numbering not required

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

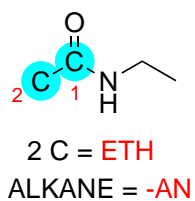


STEP 8: Write the complete name

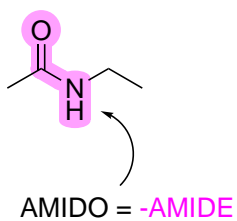
8.1 Commas are written between numbers

8.2 Hyphens are written between numbers and letters

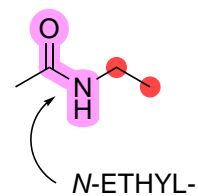
8.3 Successive words are combined into one word



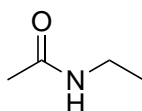
Steps 1,2



Step 3



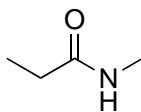
Step 4



N-ethylethanamide

Step 8

N-methylpropanamide

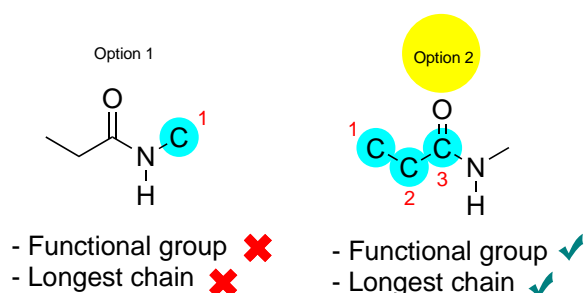


STEP 1: Identify the parent hydrocarbon chain

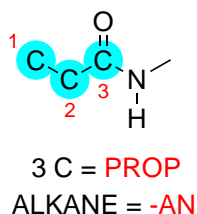
1.1 It should have the functional group with the highest priority

1.2 It should have the maximum length

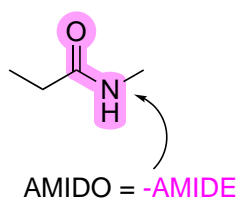
As the carboxylic acid portion of the molecule has the highest priority, this portion always determines the parent chain.



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

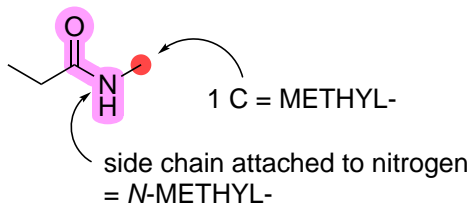


STEP 3: Identify the functional group with the highest priority and its suffix



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

As the amine portion of the molecule has the second priority, this portion is considered a side chain.



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

Not required

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

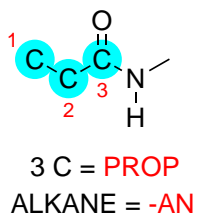
Not required

STEP 8: Write the complete name

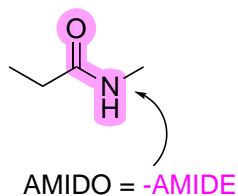
8.1 Commas are written between numbers

8.2 Hyphens are written between numbers and letters

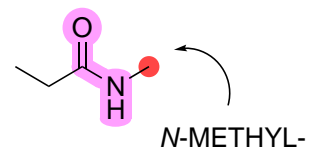
8.3 Successive words are combined into one word



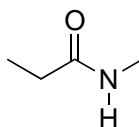
Steps 1,2



Step 3



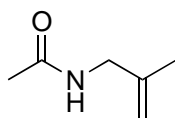
Step 4



N-methyl**propanamide**

Step 8

N-(2-methylprop-2-enyl)ethanamide

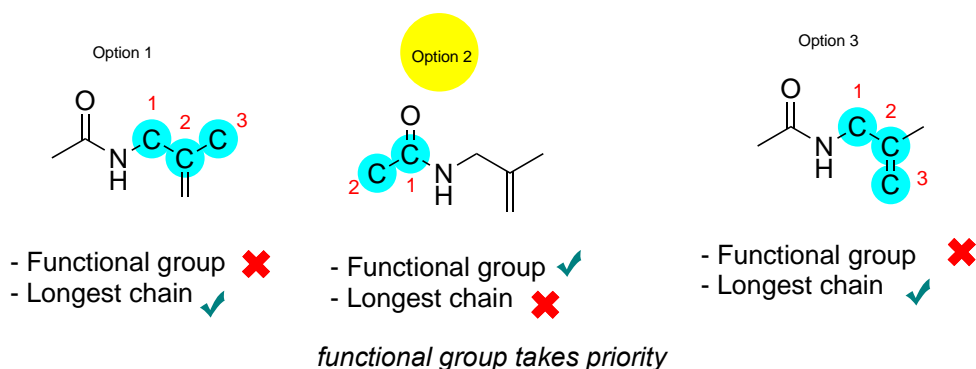


STEP 1: Identify the parent hydrocarbon chain

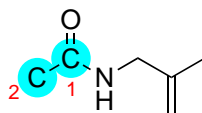
1.1 It should have the functional group with the highest priority²

1.2 It should have the maximum length

As the carboxylic acid portion of the molecule has the highest priority, this portion always determines the parent chain.

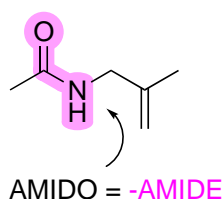


STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix



2 C = **ETH**
parent chain is an
ALKANE = **-AN**

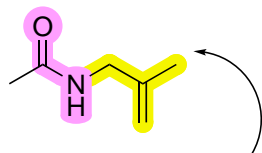
STEP 3: Identify the functional group with the highest priority and its suffix



² The most recent IUPAC Blue Book release does not consider alkene substituents when determining the parent chain. However, in this example, the alkene is not in the parent chain (here determined by the carboxylic acid portion of the molecule).

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

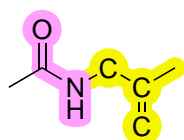
As the amine portion of the molecule has the second priority, this portion is considered a side chain.



side chain attached to N
starts with N-

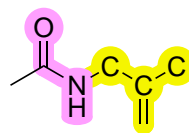
This is a branched chain, so we need to decide on the parent chain of the side chain.³

Option 1

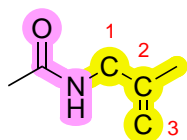


- Functional group ✓
- Longest chain ✓

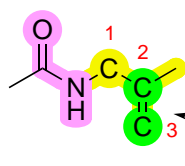
Option 2



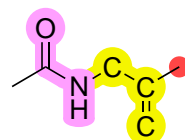
- Functional group ✗
- Longest chain ✓



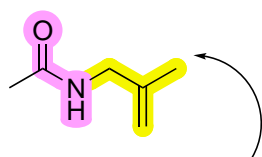
3 C = PROP



double bond
= -EN



1 C = METHYL-



side chain attached to N
must end in -YL

³ The most recent IUPAC Blue Book release does not consider alkene substituents when determining the parent chain. However, in this case, the 'parent chain' contains three carbons whether or not the alkene group is included. The pre-2013 nomenclature rules have been followed in this example, producing the name: **2-methylprop-2-enyl** for the amine portion of the molecule. However, according to the post-2013 nomenclature rules, the name **2-methenyl-propyl** would also be acceptable.

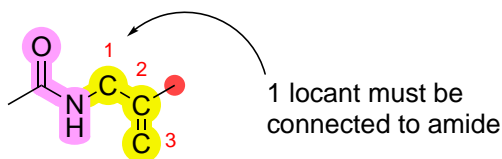
STEP 5: Identify any remaining functional groups (including double and triple bonds) and their suffixes

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

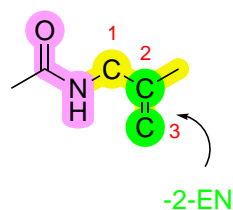
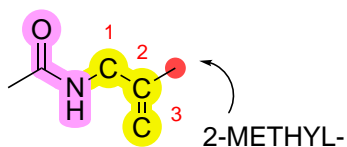
Not required for parent chain

For side chain:



Methyl = 2
-ene = 2

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

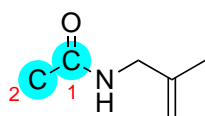


STEP 8: Write the complete name

8.1 Commas are written between numbers

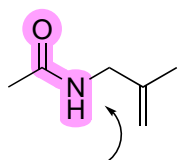
8.2 Hyphens are written between numbers and letters

8.3 Successive words are combined into one word



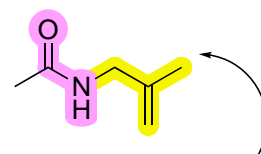
2 C = **ETH**
parent chain is an
ALKANE = **-AN**

Steps 1,2



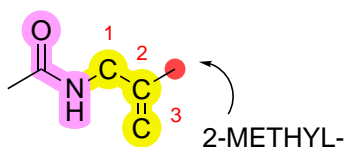
AMIDO = **-AMIDE**

Step 3

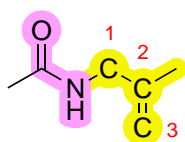


side chain attached to N
starts with **N-**

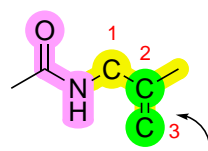
Step 4



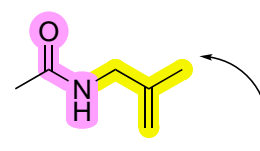
2-METHYL-



3 C = **PROP**

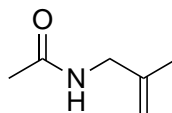


-2-EN



side chain attached to N
must end in **-YL**

Steps 4,6,7⁴



N-(2-methylprop-2-enyl)ethanamide

brackets used for clarity
contains all of **N-** connected
side chain

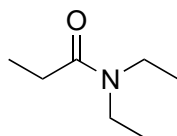
Step 8

⁴ The pre-2013 nomenclature rules have been followed in this example, producing the name:

N-(2-methylprop-2-enyl) for the amine portion of the molecule. However, according to the post-2013 nomenclature rules, the name **N-(2-methenylpropyl)** would also be acceptable.

Worked Examples – Tertiary Amides

N,N-diethylpropanamide

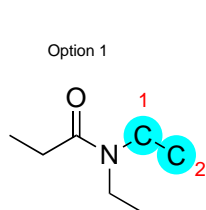


STEP 1: Identify the parent hydrocarbon chain

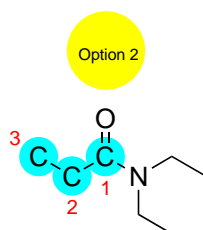
1.1 It should have the functional group with the highest priority

1.2 It should have the maximum length

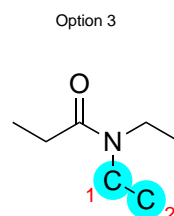
As the carboxylic acid portion of the molecule has the highest priority, this portion always determines the parent chain.



- Functional group ✗
- Longest chain ✗

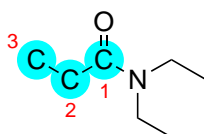


- Functional group ✓
- Longest chain ✓



- 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



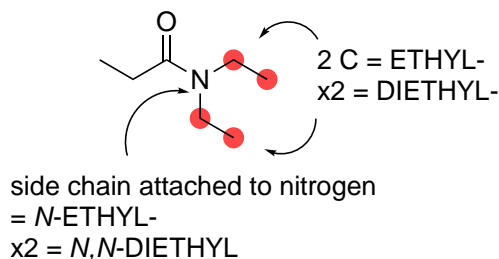
3 C = **PROP**
ALKANE = **-AN**

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 suffixes

As the amine portion of the molecule has the second priority, this portion is considered a side chain.



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

Not required

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

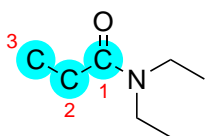
Not required

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

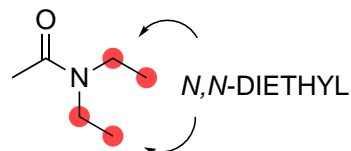


3 C = PROP
ALKANE = -AN

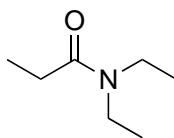
Steps 1,2



Step 3



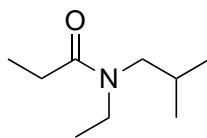
Step 4



N,N-diethylpropanamide

Step 8

N-ethyl-*N*-(2-methylpropyl)propanamide

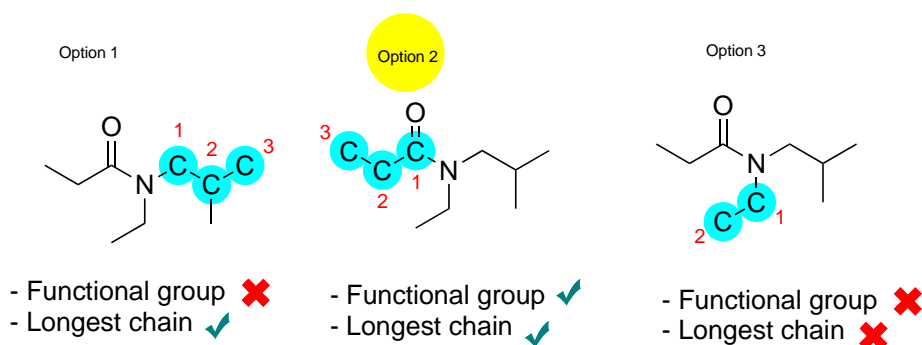


STEP 1: Identify the parent hydrocarbon chain

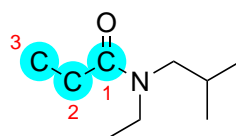
1.1 It should have the functional group with the highest priority

1.2 It should have the maximum length

As the carboxylic acid portion of the molecule has the highest priority, this portion always determines the parent chain.



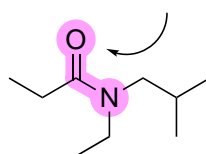
STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix



3 C = PROP
ALKANE = -AN

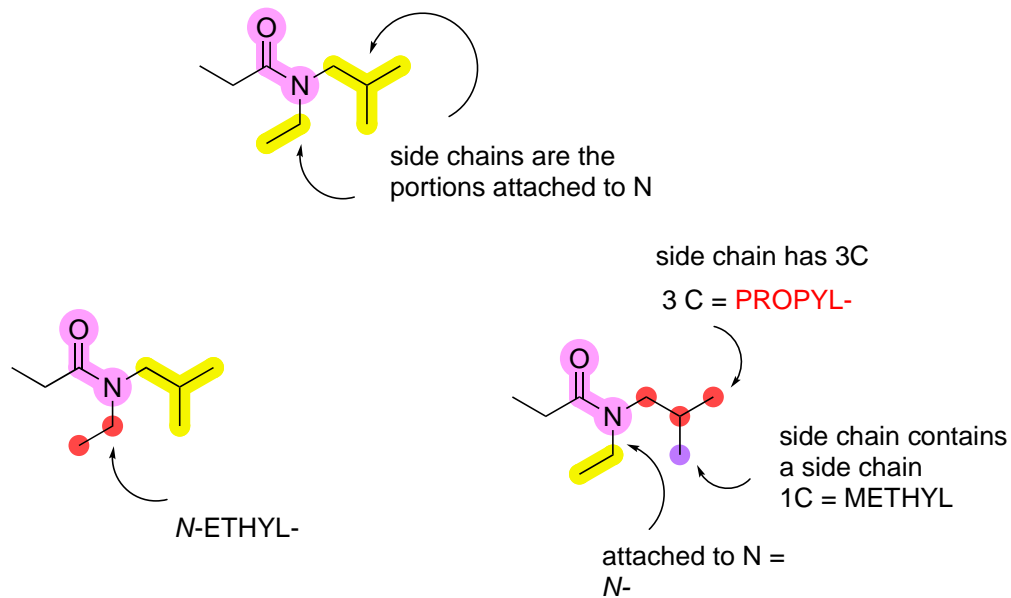
STEP 3: Identify the functional group with the highest priority and its suffix

AMIDO = -AMIDE



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

As the amine portion of the molecule has the second priority, this portion is considered a side chain.



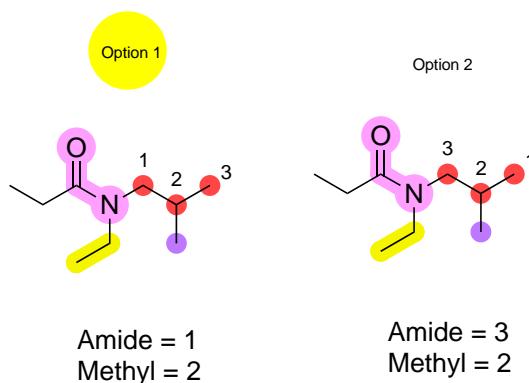
STEP 5: Identify any remaining functional groups (including double and triple bonds) and their suffixes

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

Not required for parent chain

Required for branched side chain



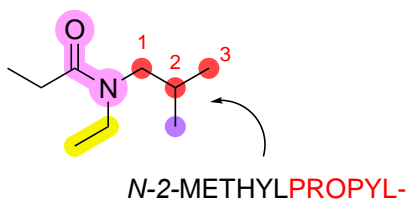
Lowest locants possible ✓
Following priorities ✓

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)

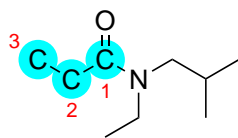


STEP 8: Write the complete name

8.1 Commas are written between numbers

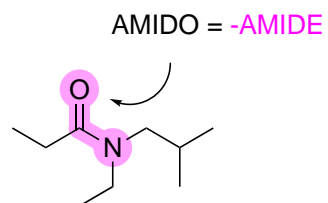
8.2 Hyphens are written between numbers and letters

8.3 Successive words are combined into one word

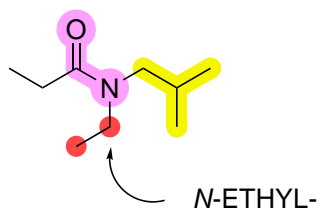


3 C = **PROP**
ALKANE = **-AN**

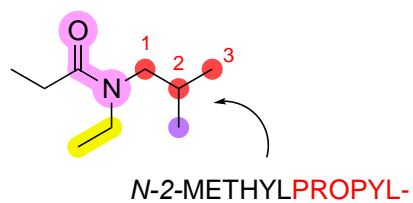
Steps 1,2



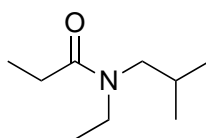
Step 3



Step 4



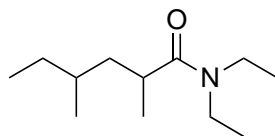
Step 4,6,7



N-ethyl-*N*-(2-methylpropyl)propanamide

Step 8

N,N-diethyl-2,4-dimethylhexanamide

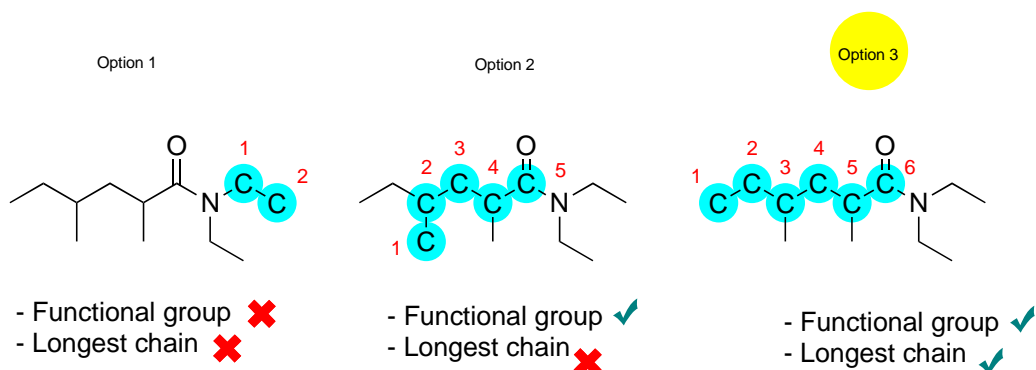


STEP 1: Identify the parent hydrocarbon chain

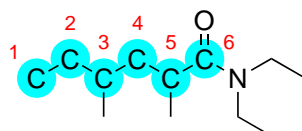
1.1 It should have the functional group with the highest priority

1.2 It should have the maximum length

As the carboxylic acid portion of the molecule has the highest priority, this portion always determines the parent chain.

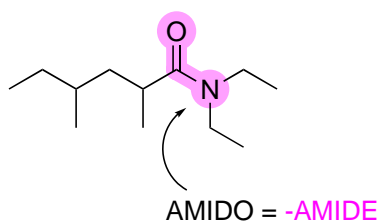


STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix



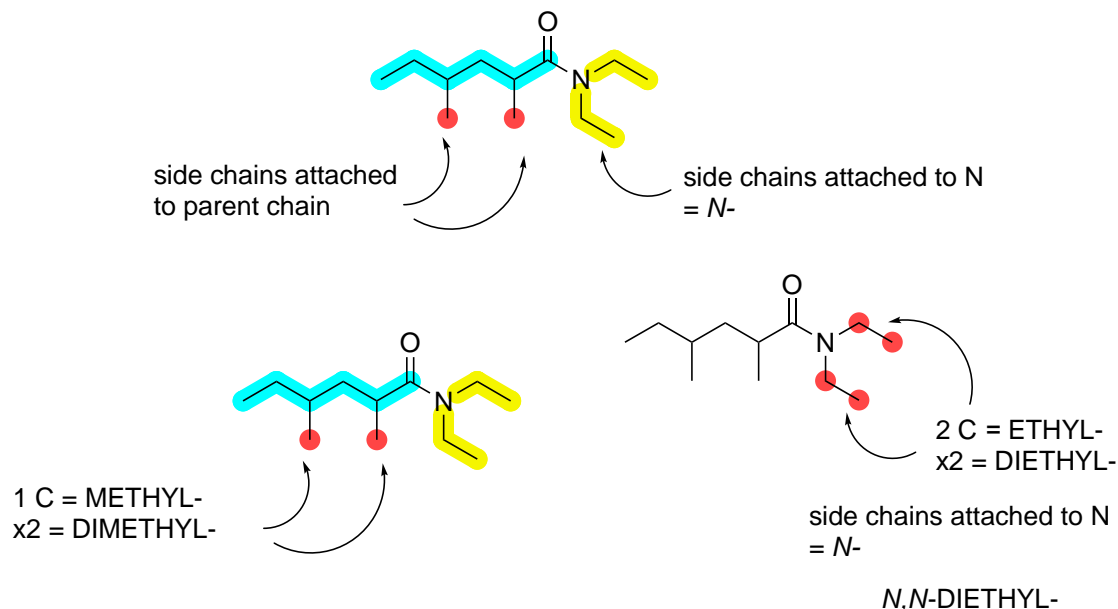
6 C = **HEX-**
ALKANE = **-AN**

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 suffixes

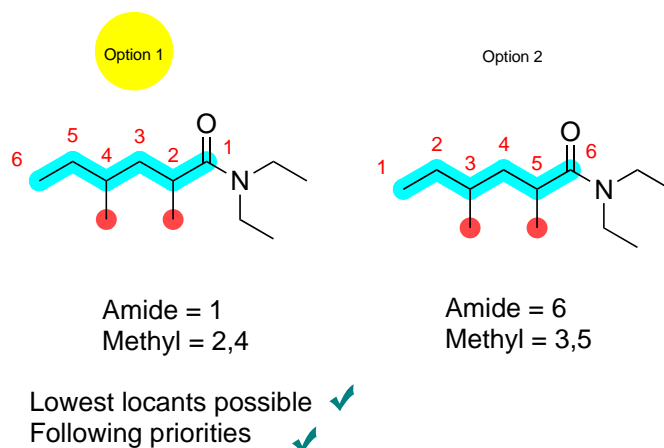
As the amine portion of the molecule has the second priority, this portion is considered a side chain.



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

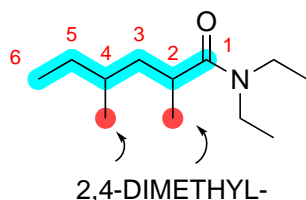


STEP 7: Numbers indicating the locant of the functional group are placed directly before the functional group portion of the name.

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)

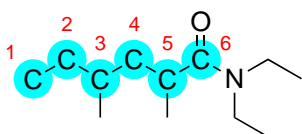


STEP 8: Write the complete name

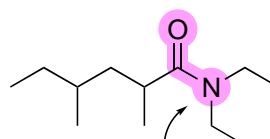
8.1 Commas are written between numbers

8.2 Hyphens are written between numbers and letters

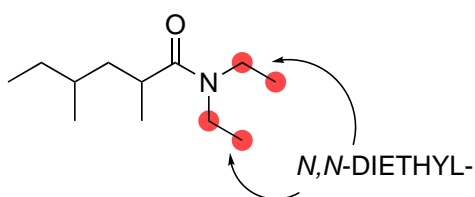
8.3 Successive words are combined into one word



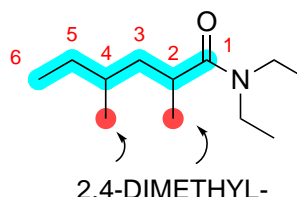
Steps 1,2



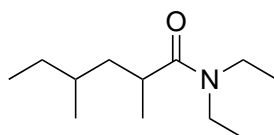
Step 3



Step 4



Steps 4,6,7



N,N-diethyl-2,4-dimethylhexanamide

Step 8