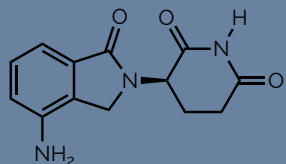# Naming molecules

Making MOLECULES
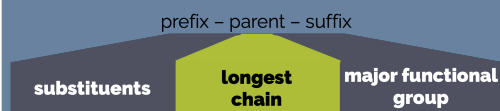www.makingmolecules.com

1. Introduction

(*R*)-3-(4-amino-1-oxoisoindolin-2-yl)piperidine-2,6-dione

The best way to communicate a molecule's structure is to draw it. Next best is a systematic name that unambiguously describes the structure.

2. Anatomy of a name

prefix – parent – suffix

| substituents | longest chain | major functional group |

prefix = all of molecule not listed below
parent = longest carbon chain (+multiple bonds)
suffix = major functional group

3. Priority & names of functional groups

	structure	functional group	prefix	suffix
1.	R–COOH	carboxylic acid		-oic acid
2.	R–CO–O–R²	ester		-oate
3.	R–CO–Cl	acyl chloride		-oyl chloride
4.	R–CO–NH–R²	amide		-amide
5.	R–C≡N	nitrile	cyano-	-nitrile
6.	R–CHO	aldehyde	oxo-	-al
7.	R–CO–R²	ketone	oxo-	-one

	structure	functional group	prefix	suffix
8.	R–OH	alcohol	hydroxy-	-ol
9.	R–NH₂	amine	amino-	-amine
10.	R–CH=CH₂	alkene		-ene
10.	R–C≡CH	alkyne		-yne
11.	R–CH₃	alkane		-ane
12.	R–O–R²	ether	alkoxy-	
13.	R–X	halide	halo-	
13.	R–NO₂	nitro	nitro-	

4. Carbon chains

Number of carbons	Alkane name	Number of carbons	Alkane name
1	methane	6	hexane
2	ethane	7	heptane
3	propane	8	octane
4	butane	9	nonane
5	pentane	10	decane

Add **cyclo-** for a saturated ring:

= **cyclo**pentane

5. Conclusion
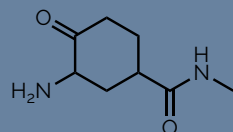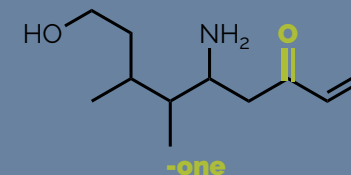
3-amino-*N*-methyl-4-oxocyclohexane-1-carboxamide

Being able to name an organic molecule is a useful skill. It is a series of rules that are best learnt by practicing. Attempt the worksheet questions.

6. An Example

Step 1 - Identify functional group

Identify the major functional group according to the table in box 3. If no functional group use *-ane* suffix.

-one

Step 2 - Determine the parent

This is the longest carbon chain. It must include the major functional group. If there is no major functional group it should contain an alkene/alkyne, otherwise it is the chain with the most substituents. The name of the parent is based on the *(cyclo)alkanes* (box 4).

nonane
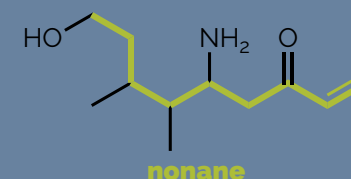
Step 3 - Number the parent

The chain is numbered from one end to the other. The major functional group will have the lowest possible number. The numbering does not change.
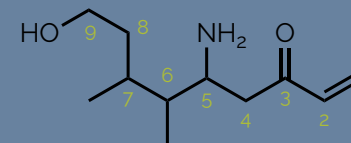
Step 4 - Prefix

All other substituents and functional groups (except alkene/alkyne) are placed in the prefix. They must be numbered according to step 3 so that we know where they are.

1-ene, 5-amino, 6,7-dimethyl, 9-hydroxy
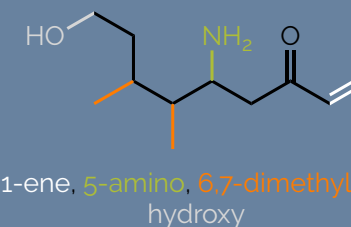
Step 5 - Put it all together

The prefix is listed in alphabetic order,. Next comes the parent, followed by multiple bonds & finally, the major functional group. The number of each substituent should be placed next to the prefix or suffix.

5-amino-9-hydroxy-6,7-dimethylnon-1-en-3-one