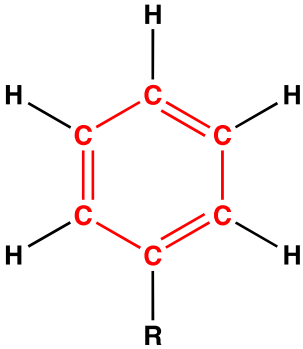


# Benzenes

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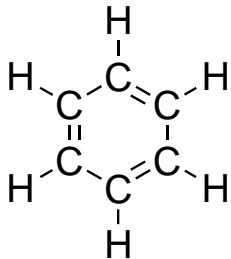
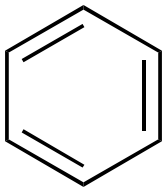
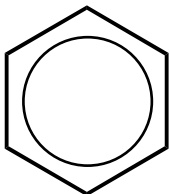
## Summary

Functional Group	General Formula	Structure	Prefix	Suffix
<i>Benzene</i>	$C_6H_6$		-phenyl	-benzene

Benzenes are included in the Queensland, Western Australian, Tasmanian and Victorian year 11 and 12 curriculum. Students are not required to name benzenes in any of these courses, however, they are required to recognise the structure of benzenes.

Benzenes are aromatic compounds consisting of six carbon atoms covalently bonded in a flat, hexagonal shape. Each bond has partial single/partial double bond characteristics and thus benzene is sometimes displayed as containing alternate single/double bonds, and sometimes displayed as all single bonds with a circle inside the hexagon to represent the continuous nature of the bonds.

### Benzene structures

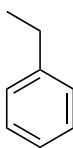
Extended Structural Formula	Skeletal structure - preferred	Skeletal structure - acceptable
		

If students are interested in naming benzenes, the general naming steps can be followed. The functional group of the highest priority takes the 1 position, and other functional groups are named according to Step 6 – the lowest number of locants possible.

If benzene is the highest priority functional group, the suffix benzene is used. If the benzene ring is a substituent, the prefix is 'phenyl' (e.g. 2-phenyl-1-ethanol).

## Worked Examples

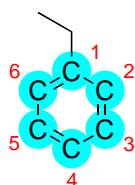
ethylbenzene



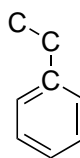
**STEP 1:** Identify the parent hydrocarbon chain

**1.1** It should have the functional group with the highest priority

**1.2** It should have the maximum length

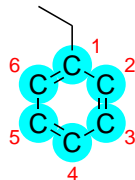


- Functional group ✓  
- Longest chain ✓



- 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

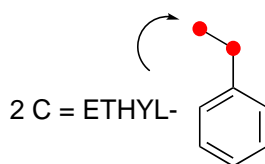


6C in benzene = BENZENE

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

N/A

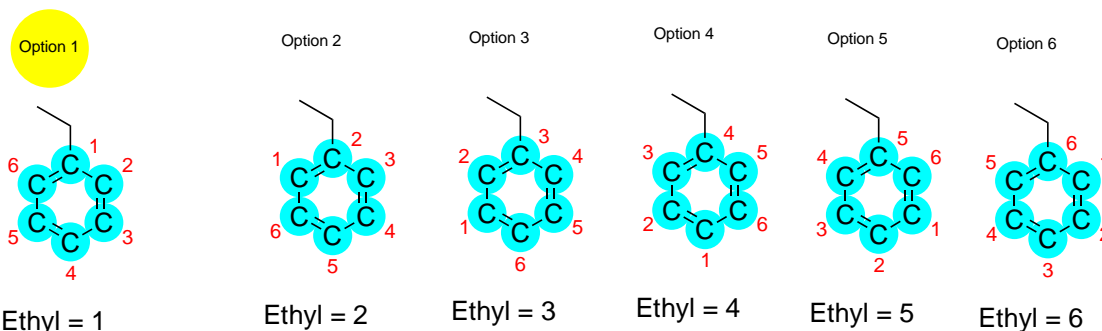
**STEP 4:** Identify side chains. Count the number of carbons and identify their prefix and suffix



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

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.

**7.3** 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)

1-Ethyl

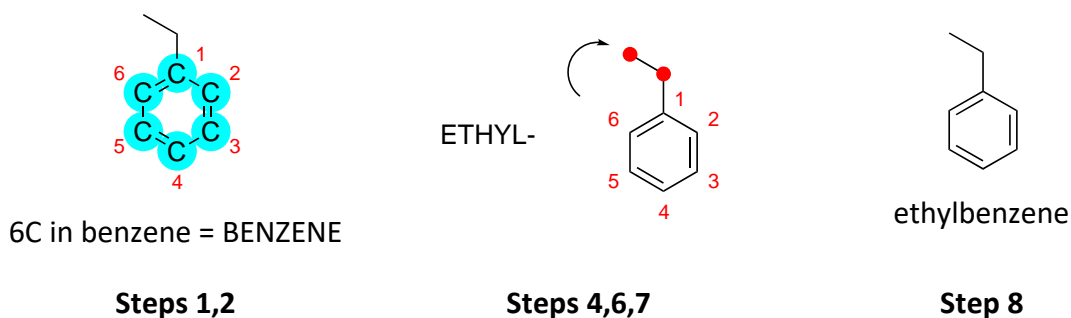
*As there is only one option for the locant of the ethyl group, the number is not written*

**STEP 8:** Write the complete name

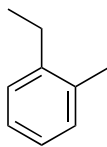
**8.1** Commas are written between numbers

**8.2** Hyphens are written between numbers and letters

**8.3** Successive words are combined into one word



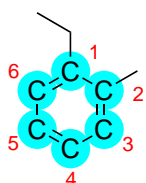
1-ethyl-2-methylbenzene



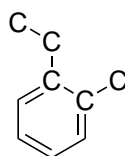
**STEP 1:** Identify the parent hydrocarbon chain

**1.1** It should have the functional group with the highest priority

**1.2** It should have the maximum length

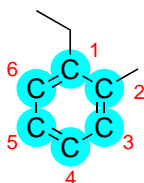


- Functional group ✓  
- Longest chain ✓



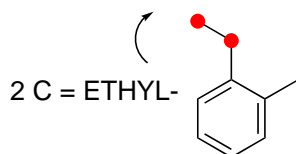
- Functional group ✗  
- Longest chain ✗

**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

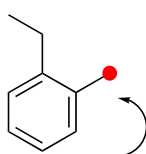


6C in benzene = benzene

**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

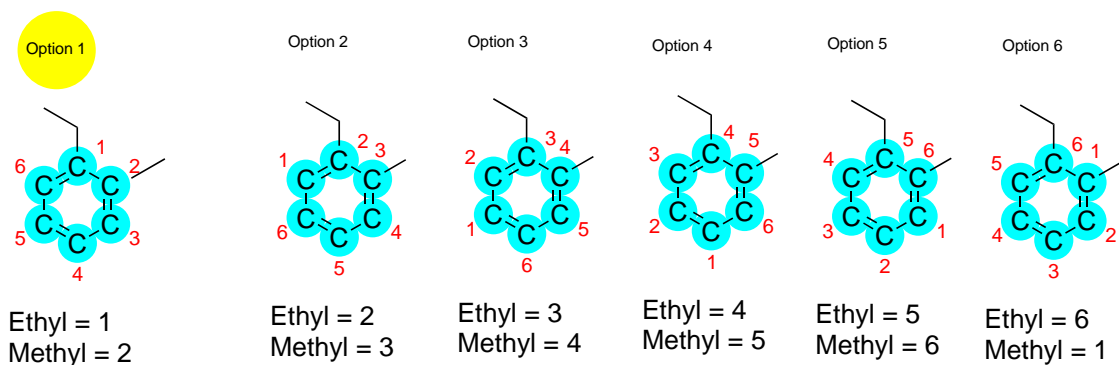


1 C = METHYL-

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

None

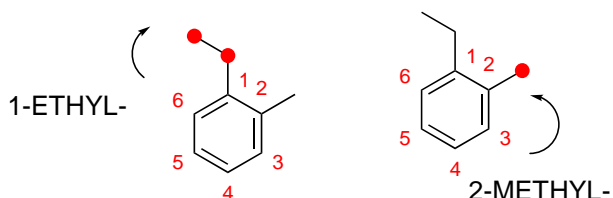
**STEP 6:** Number the parent hydrocarbon chain from the end that produces the lowest set of locants for, in order of precedence, functional groups, double and triple bonds and side chains



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

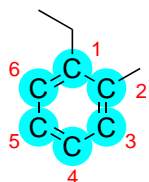


**STEP 8:** Write the complete name

**8.1** Commas are written between numbers

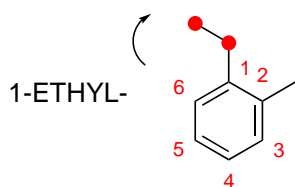
**8.2** Hyphens are written between numbers and letters

**8.3** Successive words are combined into one word

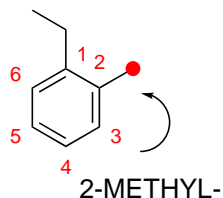


benzene

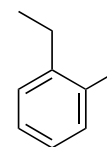
**Steps 1,2**



**Steps 3,6,7**



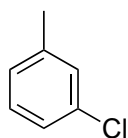
**Steps 4,6,7**



1-ethyl-2-methylbenzene

**Step 8**

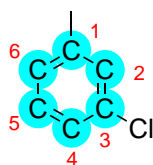
1-chloro-3-methylbenzene



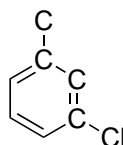
**STEP 1:** Identify the parent hydrocarbon chain

**1.1** It should have the functional group with the highest priority

**1.2** It should have the maximum length

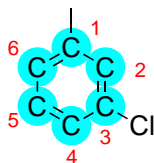


- Functional group ✓  
- Longest chain ✓



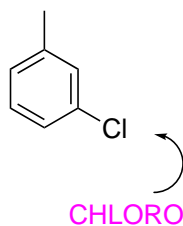
- Functional group ✗  
- Longest chain ✗

**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



6 C in benzene = benzene

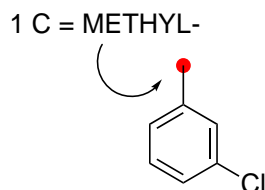
**STEP 3:** Identify the functional group with the highest priority and its suffix



Halide (Chlorine) = Chloro



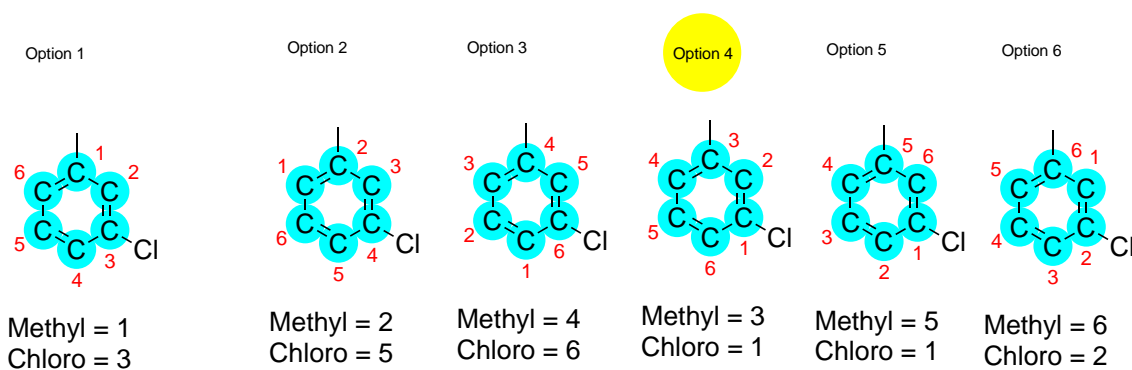
**STEP 4:** Identify side chains. Count the number of carbons and identify their prefix and suffix



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

None

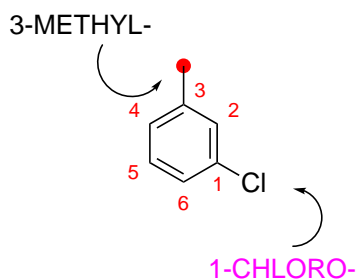
**STEP 6:** Number the parent hydrocarbon chain from the end that produces the lowest set of locants for, in order of precedence, functional groups, double and triple bonds and side chains



Lowest locants possible  
Halide higher priority than alkane

**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

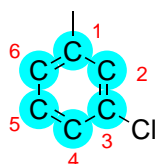


**STEP 8:** Write the complete name

**8.1** Commas are written between numbers

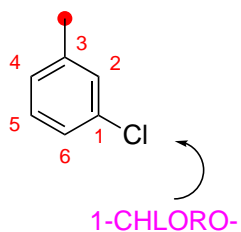
**8.2** Hyphens are written between numbers and letters

**8.3** Successive words are combined into one word

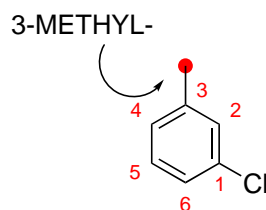


benzene

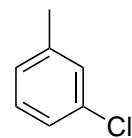
**Steps 1,2**



**Steps 3,6,7**



**Steps 4,6,7**



1-chloro-3-methylbenzene

**Step 8**