This page looks at the names of some simple aromatic compounds. An aromatic compound is one which contains a benzene ring. Naming aromatic compounds isn’t quite so straightforward as naming chain compounds. Often, more than one name is acceptable and it is not uncommon to find the old names still in use as well.

The Benzene Ring

Most, but not all, aromatic compounds are based on benzene, C₆H₆, which has a ring of six carbon atoms and has the symbol:

![Benzene Ring](image)

Each corner of the hexagon has a carbon atom with a hydrogen attached.

The Phenyl Group

Remember that you get a methyl group, CH₃, by removing a hydrogen from methane, CH₄. You get a phenyl group, C₆H₅, by removing a hydrogen from a benzene ring, C₆H₆. Like a methyl or an ethyl group, a phenyl group is always attached to something else.

Aromatic compounds with only one group attached to the benzene ring

Cases where the name is based on benzene

**chlorobenzene**

This is a simple example of a halogen attached to the benzene ring. The name is self-obvious.

![Chlorobenzene](image)

The simplified formula for this is C₆H₅Cl. You could therefore (although you never do!) call it phenyl chloride. Whenever you draw a benzene ring with one other thing attached to it, you are in fact drawing a phenyl group. In order to attach something else, you have to remove one of the existing hydrogen atoms, and so automatically make a phenyl group.

**nitrobenzene**

The nitro group, NO₂, is attached to a benzene ring.
The simplified formula for this is C₆H₅NO₂.

**methylbenzene**

Another obvious name - the benzene ring has a methyl group attached. Other alkyl side-chains would be named similarly - for example, ethylbenzene. The old name for methylbenzene is toluene, and you may still meet that.

The simplified formula for this is C₆H₅CH₃.

**(chloromethyl)benzene**

A variant on this which you may need to know about is where one of the hydrogens on the CH₃ group is replaced by a chlorine atom. Notice the brackets around the (chloromethyl) in the name. This is so that you are sure that the chlorine is part of the methyl group and not somewhere else on the ring.

If more than one of the hydrogens had been replaced by chlorine, the names would be (dichloromethyl)benzene or (trichloromethyl)benzene. Again, notice the importance of the brackets in showing that the chlorines are part of the side group and not directly attached to the ring.

**benzoic acid (benzenecarboxylic acid)**

Benzoic acid is the older name, but is still in common use - it's a lot easier to say and write than the modern alternative! Whatever you call it, it has a carboxylic acid group, -COOH, attached to the benzene ring.
Cases where the name is based on phenyl

Remember that the phenyl group is a benzene ring minus a hydrogen atom - C₆H₆. If you draw a benzene ring with one group attached, you have drawn a phenyl group.

**phenylamine**

Phenylamine is a primary amine and contains the -NH₂ group attached to a benzene ring.

![Phenylamine structure]

The old name for phenylamine is aniline, and you could also reasonably call it aminobenzene.

**phenylethene**

This is an ethene molecule with a phenyl group attached. Ethene is a two carbon chain with a carbon-carbon double bond. Phenylethene is therefore:

![Phenylethene structure]

The old name for phenylethene is styrene - the monomer from which polystyrene is made.

**phenylethanone**

This is a slightly awkward name - take it to pieces. It consists of a two carbon chain with no carbon-carbon double bond. The *one* ending shows that it is a ketone, and so has a C=O group somewhere in the middle. Attached to the carbon chain is a phenyl group. Putting that together gives:

![Phenylethanone structure]

**phenyl ethanoate**

This is an ester based on ethanoic acid. The hydrogen atom in the -COOH group has been replaced by a phenyl group.
phenol

Phenol has an -OH group attached to a benzene ring and so has a formula C₆H₅OH.

Aromatic compounds with more than one group attached to the benzene ring

Any group already attached to the ring is given the number 1 position. Where you draw it on the ring (at the top or in any other position) doesn’t matter - that’s just a question of rotating the molecule a bit. It’s much easier, though, to get in the habit of drawing your main group at the top.

The other ring positions are then numbered from 2 to 6. You can number them either clockwise or anti-clockwise. As with chain compounds, you number the ring so that the name you end up with has the smallest possible numbers in it. Examples will make this clear.

Example 1: Chlorine atoms on the Ring

Look at these compounds:

2-chloromethylbenzene
3-chloromethylbenzene
4-chloromethylbenzene

All of these are based on methylbenzene and so the methyl group is given the number 1 position on the ring. Why is it 2-chloromethylbenzene rather than 6-chloromethylbenzene? The ring is numbered clockwise in this case because that produces a 2- in the name rather than a 6-. 2 is smaller than 6.
**2-hydroxybenzoic acid**

This might also be called 2-hydroxybenzenecarboxylic acid. There is a -COOH group attached to the ring and, because the name is based on benzoic acid, that group is assigned the number 1 position. Next door to it in the 2 position is a hydroxy group, -OH.

![2-hydroxybenzoic acid structure](image)

**benzene-1,4-dicarboxylic acid**

The *di* shows that there are two carboxylic acid groups, -COOH, one of them in the 1 position and the other opposite it in the 4 position.

![benzene-1,4-dicarboxylic acid structure](image)

**2,4,6-trichlorophenol**

This is based on phenol - with an -OH group attached in the number 1 position on the ring. There are 3 chlorine atoms substituted onto the ring in the 2, 4 and 6 positions.

![2,4,6-trichlorophenol structure](image)

**methyl 3-nitrobenzoate**

This is a name you might come across as a part of a practical exercise in nitrating benzene rings. It's included partly for that reason, and partly because it is a relatively complicated name to finish with! The structure of the name shows that it is an ester. You can tell that from the *oate* ending, and the methyl group floating separately from the rest of the name at the beginning. The ester is based on the acid, 3-nitrobenzoic acid - so start with that.

There will be a benzene ring with a -COOH group in the number 1 position and a nitro group, NO₂, in the 3 position. The -COOH group is modified to make an ester by replacing the hydrogen of the -COOH group by a methyl group. Methyl 3-nitrobenzoate is therefore:

![methyl 3-nitrobenzoate structure](image)
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