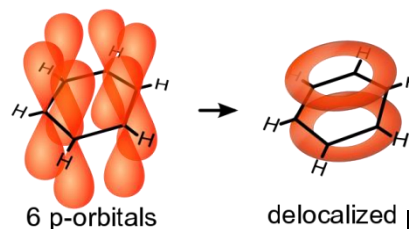


Aromatic Compounds

The key areas of study in this topic are:

- Benzene and aromatic compounds
- Electrophilic substitution
- Phenols



By the end of this topic I should be able to:

	Start	End
Compare the Kekulé model of benzene with the subsequent delocalised models for benzene in terms of p-orbital overlap forming a delocalised π -system		
Review the experimental evidence for a delocalised, rather than Kekulé, model for benzene in terms of bond lengths, enthalpy change of hydrogenation and resistance to reaction		
Use the IUPAC rules of nomenclature for systematically naming substituted aromatic compounds		
Describe the electrophilic substitution of aromatic compounds with: <ul style="list-style-type: none"> • concentrated nitric acid in the presence of concentrated sulfuric acid • a halogen in the presence of a halogen carrier • a haloalkane or acyl chloride in the presence of a halogen carrier (Friedel–Crafts reaction) and its importance to synthesis by formation of a C–C bond to an aromatic ring 		
Describe the mechanism of electrophilic substitution in arenes for nitration and halogenation		
Explain the relative resistance to bromination of benzene, compared with alkenes, in terms of the delocalised electron density of the π -system in benzene compared with the localised electron density of the π -bond in alkenes		
Interpret and predict the mechanisms of unfamiliar electrophilic substitution reactions of aromatic compounds		
Describe the weak acidity of phenols as shown by the neutralisation reaction with NaOH but absence of reaction with carbonates		
Describe the electrophilic substitution reactions of phenol: <ul style="list-style-type: none"> • with bromine to form 2,4,6-tribromophenol • with dilute nitric acid to form 2-nitrophenol 		
Explain the relative ease of electrophilic substitution of phenol compared with benzene, in terms of electron pair donation to the π -system from an oxygen p-orbital in phenol		
Explain the 2- and 4-directing effect of electron-donating groups (OH, NH ₂) and the 3-directing effect of electron-withdrawing groups (NO ₂) in electrophilic substitution of aromatic compounds		
Predict the substitution products of aromatic compounds by directing effects and the importance to organic synthesis		

In all topic areas you should be able to demonstrate and apply your knowledge and understanding.