

Specification link-up

3.4.7

- Base properties (Brønsted–Lowry)
- Nucleophilic properties
- Preparation

Chapter teacher guide

Chapter 7 introduces students to organic nitrogen compounds and the nomenclature of amines is explained in Topic 7.1. The naming convention for amines is slightly different from that for alcohols which students studied in AS Topic 16.1; a tertiary amine has 3 alkyl groups attached directly to the nitrogen atom, whereas in a tertiary alcohol the oxygen atom is attached to a carbon atom which is itself attached to 3 other carbon atoms. It is useful to emphasise this difference to students to avoid confusion and errors at a later date.

The physical and base properties of amines are then outlined in the remainder of Topics 7.1 and 7.2. When teaching these subjects it is useful to start by asking students to recall and explain the

properties and base behaviour of ammonia – a molecule with which they are familiar – before asking them to go on and predict the properties of amines. Highlighting that amines have similar properties to ammonia, with their behaviour modified by the presence of alkyl groups should deepen students' understanding of this topic area.

Students also need to be able to explain why ammonia and amines behave as nucleophiles and understand the reaction (including mechanism) of ammonia and amines with haloalkanes to form primary, secondary and tertiary amines. These reactions are outlined in Topic 7.3. However, for the mechanism of these reactions students will need to be referred back to the AS Haloalkanes Topic 14.2.

7.1 Introduction to amines

Specification link-up 3.4.7: Base properties (Brønsted–Lowry)

- What are amines?
- How are they named?
- How do they react?

7.3 Amines as nucleophiles and their synthesis

Specification link-up 3.4.7: Nucleophilic properties, Preparation

- Why do ammonia and amines act as nucleophiles?
- How do haloalkanes react with ammonia and amines?
- How are amines prepared from nitriles?
- How are aromatic amines synthesised from benzene?

7.2 The base properties of amines

Specification link-up 3.4.7: Base properties (Brønsted–Lowry)

- Why do amines behave as Brønsted–Lowry bases?
- Why do the base strengths of amines differ from each other and from ammonia?