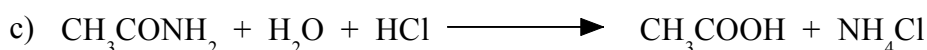


## Chemguide – answers

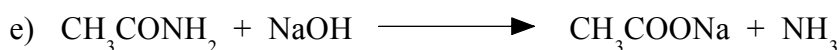
### AMIDES: HYDROLYSIS

1. a) ammonium ethanoate

b) ethanoic acid and ammonium chloride



d) sodium ethanoate and ammonia



If you find the products confusingly difficult to remember, think of it like this. If you just used water, you would get ammonium ethanoate – that's the reverse of how you make ethanamide in the first place. What would happen to that in the presence of hydrochloric acid or sodium hydroxide solution?

With hydrochloric acid: Ethanoic acid is a weak acid, and the ethanoate ions in ammonium ethanoate would combine with the hydrogen ions from the strong acid, hydrochloric acid, to give ethanoic acid. What happens to the ammonium ions? Nothing. So you are left with ammonium ions and chloride ions (ammonium chloride) and ethanoic acid.

With sodium hydroxide solution: This wouldn't do anything to the ethanoate ions – they are both negatively charged. But hydroxide ions react with ammonium ions to make ammonia. So you are left with sodium ions and ethanoate ions in solution (sodium ethanoate) and ammonia.

2. a) Warm the suspected amide with sodium hydroxide solution and look for the evolution of ammonia gas (smell, and turns red litmus blue).

b) Several things also give ammonia when heated with sodium hydroxide solution – including ammonium salts. With ammonium salts, though, enough ammonia is produced in the cold to be detectable; with amides, you need to heat. There are also other things which give ammonia on heating with sodium hydroxide solution, but you are less likely to come across these in a practical situation at this level.