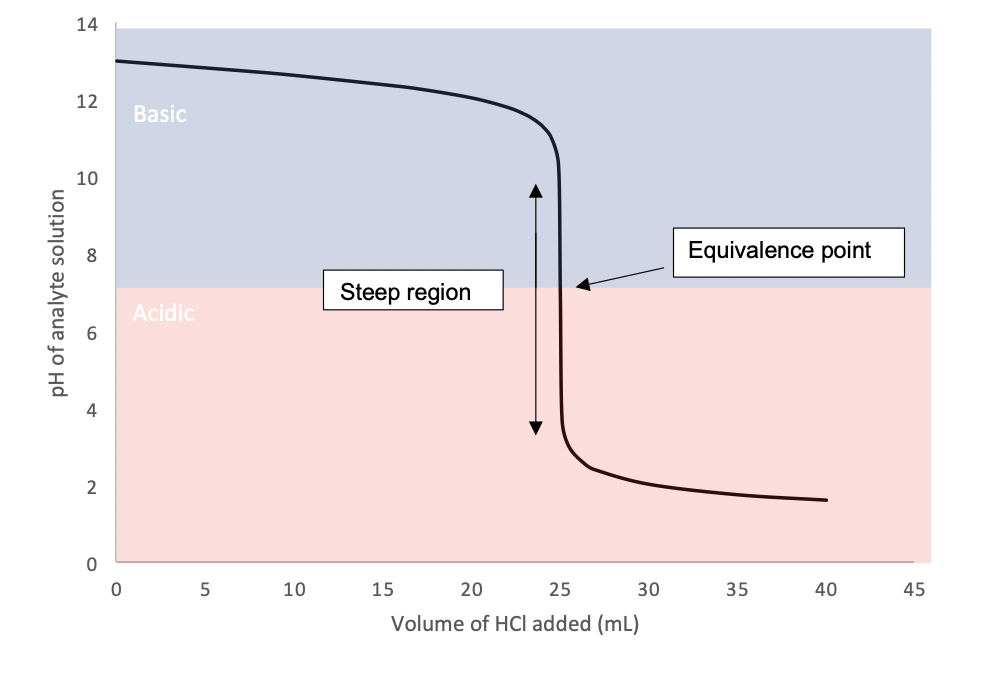
# Question 3 discussion

**Don’t worry if some of this seems complicated - it goes beyond the scope of your course!**

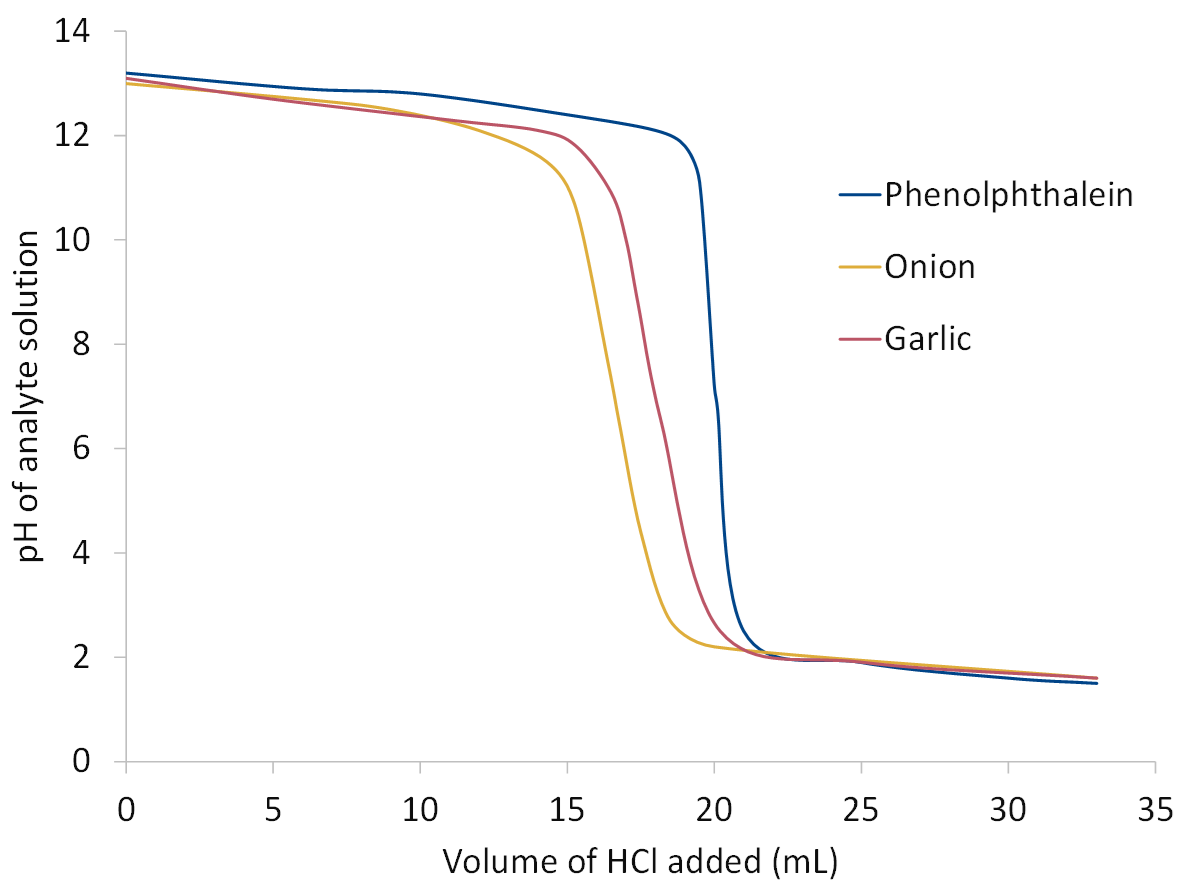
At the equivalence point in a titration there is a sudden drop in pH:



A typical strong acid-strong base titration curve.

In order for the solution to be neutral there must be an equal number of moles of NaOH and HCl. Assuming we are titrating 0.1M HCl into 10mL 0.2M NaOH, the steep region of the graph should occur when 10mL of HCl has been added (as seen when phenolphthalein is the indicator):

However, this is not what we observed when the olfactory indicators were in solution!



Real titration curves obtained when phenolphthalein, onion and garlic were used as indicators.

The fact that we need less acid than expected to neutralise the NaOH solution must mean that the onion/garlic indicators are significantly acidic, making the analyte solution less alkali than we thought!

This means that olfactory indicators cannot be used to produce accurate concentration values but are a good way for students with and without vision impairment to learn about titrations.