Determining the pK$_a$ of aspirin

Teacher and technician sheet

**Health and safety note**

Make sure that students wear eye protection and that there are no naked flames. 0.1 mol dm$^{-3}$ sodium hydroxide is an irritant. 95% ethanol is highly flammable. 2-hydroxybenzoic acid and 95% ethanol are both harmful.

**Equipment and materials**

Each student or pair of students will require:

- Access to a balance (2 or 3 d.p.)
- 50 cm$^3$ burette
- 250 cm$^3$ beaker
- 10 cm$^3$ and 100 cm$^3$ measuring cylinders
- Glass stirring rod
- Spatula
- pH probe and pH meter
- Aspirin – Harmful
- 95% ethanol – Highly flammable, Harmful
- 0.10 mol dm$^{-3}$ sodium hydroxide solution – Irritant

**Calibration of pH probe**

The pH probe (electrode) should be calibrated using two standard buffer solutions. Most pH probes and meters contain instructions for calibration and use.

**Values**

For aspirin:

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pK_a = 4.57 \\
K_a = 2.72 \times 10^{-5} \text{ mol dm}^{-3}
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