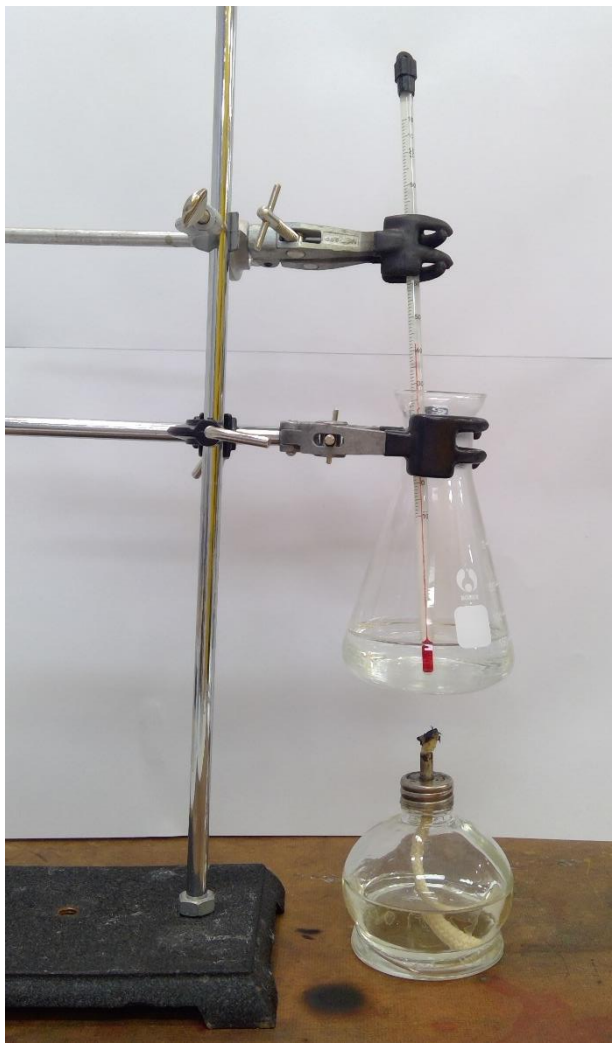
Joseph Banks Secondary College

# Practical Method

Comparing the heat energy produced by combustion of various alcohols

## Materials

- Eye protection
- Retort stand
- 2 x clamp/boss head clamp
- 3 x Conical flask
- Measuring cylinder
- Thermometer
- Electronic balances
- Spirit burners with wicks & caps, containing the alcohols
- Matches



## Chemicals

- Methanol (HIGHLY FLAMMABLE, TOXIC)
- Ethanol (HIGHLY FLAMMABLE)
- Propan-1-ol (HIGHLY FLAMMABLE, IRRITANT)
- Butan-1-ol (FLAMMABLE, IRRITANT, HARMFUL)

## Procedure

1. Measure 100 mL of cold tap water into a conical flask (Prepare x3).
2. Clamp one flask at a suitable height so that a spirit burner can easily be placed below. This distance will need to be consistent across the whole class.
3. Weigh the spirit burner (and cap) containing the alcohol and record this mass and the name of the alcohol.
4. Record the initial temperature of the water in the flask.
5. Light the burner
6. Place the spirit burner under the flask and light the wick.
7. Allow the alcohol to heat the water so the temperature rises by about 60°C (starts at 20°C) and reaches a final temperature of 80°C.
8. Once optimum temperature is reached, extinguish flame by replacing the cap.
9. Re-weigh the spirit burner and cap and record this mass. Work out the mass of alcohol used (this is required to work out the amount of energy produced per gram).
10. Using a fresh 100 mL of cold tap water, repeat the experiment with the other alcohols.
11. Repeat the experiment 3 times for each alcohol so an average can be determined