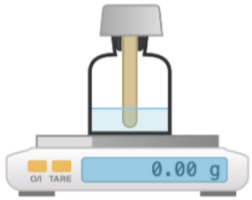
Science Mastery

Integrated Instructions

Aim: Investigate the energy produced by the combustion of various alcohols

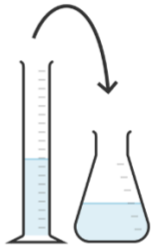
START

1. Weigh the first spirit burner of alcohol (with cap) and record its mass and the alcohol it contains.



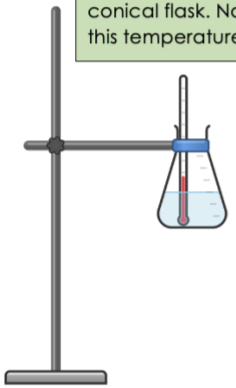
2. Place the spirit burner on a heat proof mat.

3. Use the measuring cylinder to add 100 ml of cold tap water to the conical flask.

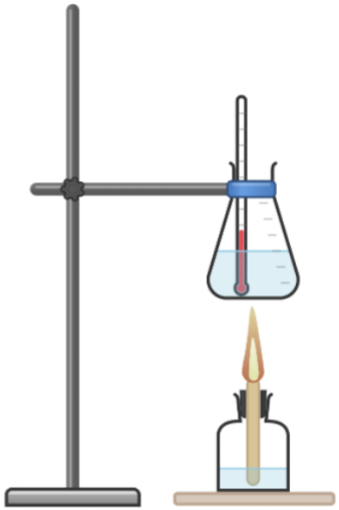


4. Use the clamp stand to hold the conical flask a few centimetres above the spirit burner.

5. Use the thermometer to measure the initial temperature of the water in the conical flask. Note this temperature.

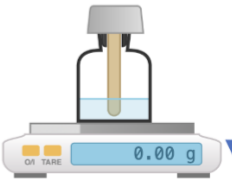


6. Remove the spirit burner's cap and light the spirit burner.



7. When the burning alcohol has heated the water by 40 °C, replace the cap on the spirit burner to extinguish the flame.

8. Use the balance to weigh the spirit burner and cap and record its new mass.



9. Calculate the mass of alcohol used to raise the temperature of the water by 40 °C.

Alcohol:	Methanol	Ethanol	Propanol	Butanol	Pentanol
Relative Formula Mass M_r	32	46	60	72	88
Mass of alcohol burned to produce 40 °C increase in temperature of 100 ml of water (g)					
Energy released per gram of alcohol burned (kJ/g)					
Energy released per mole of alcohol burned (kJ/mole)					

10. Using fresh cold tap water and a fresh, cool conical flask, repeat the above steps with another alcohol.

END