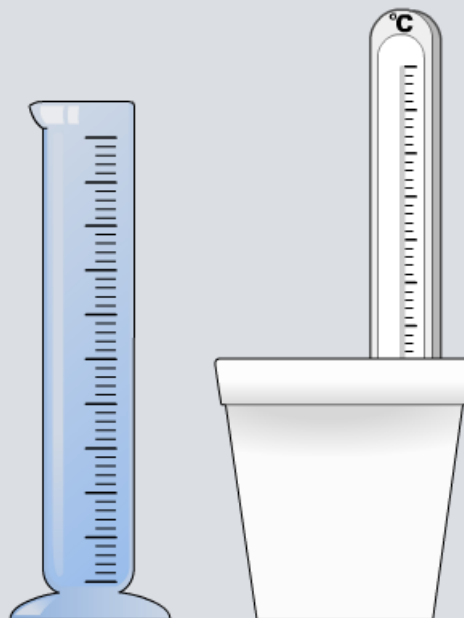# Calorimetry

Enthalpy of combustion experiment

Measuring enthalpy of combustion

Combustion reactions are exothermic.

Click **"play"** or the flame to find out how this fact is used in an experiment to measure the enthalpy of combustion.

Enthalpy of neutralization experiment

Measuring enthalpy of neutralization

Solution phase reactions may be exothermic or endothermic.

Click **"play"** to find out how we measure the enthalpy change.

hydrochloric acid

sodium hydroxide

Using experimental results

Calculating temperature change

In order to determine the temperature change during a reaction, the results need to be processed.

Click **"play"** to find out how this is done.
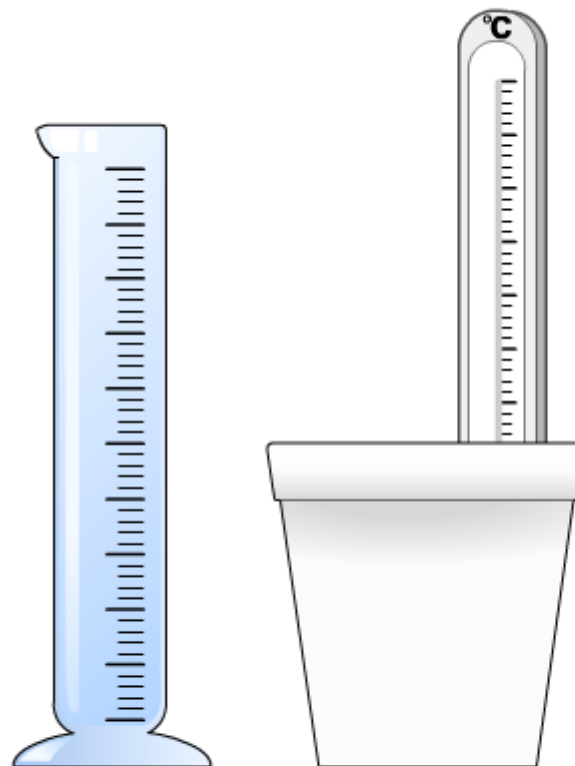
Enthalpy change can be calculated using the following equation:

$$q = mc\Delta T$$

q = enthalpy change in joules

m = mass of substance being heated (often water) in grams

c = specific heat capacity in joules per Kelvin per gram (4.18 $JK^{-1}g^{-1}$ for water)

ΔT = change of temperature in Kelvin.

To calculate the enthalpy of neutralization, the density and specific heat capacities of the acid and base used are taken to be the same as for pure water.

Calorimetry calculation examples

Enthalpy calculation examples

Find the enthalpy of the reaction between sodium and water

0.25g of sodium reacted with 100 cm^3 of water producing a temperature rise of 6.2K. Calculate the enthalpy change per mole of sodium. (The specific heat capacity of water is 4.18 J K^{-1}g^{-1}).

1. Figure out moles of sodium:

$$= \text{mass} / M_r$$
$$= 0.25 / 23.0$$
$$= 0.0109$$

Click the "**=**" button to show the solution step by step.

2. Write down the calorimetry equation:

$$q = mc\Delta T$$

object Scr
Cmp v1.2

Calorimetry calculation problems

Calorimetry calculations

Question: 1/5

The energy from 0.01 moles of methanol was used to heat 200 g of water. The temperature of the water rose from 293 K to 309.5 K. What is the enthalpy of combustion of methanol?

+1379 kJ mol^{-1}

-1379 kJ mol^{-1}

+1739 kJ mol^{-1}

-1739 kJ mol^{-1}