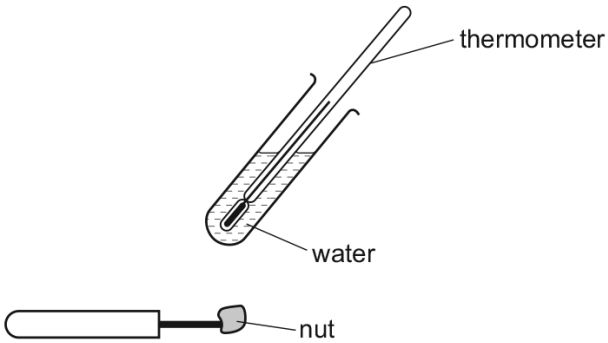
## 5.2 Energy transfer

01. 0620_s14_qp_61 Q: 6

Nuts contain oil. Nuts can be burned to produce energy. The apparatus shown can be used to compare the energy produced by burning different nuts.




Plan an investigation to show which of three different types of nut produce the most energy. You are provided with peanuts, brazil nuts and hazelnuts.

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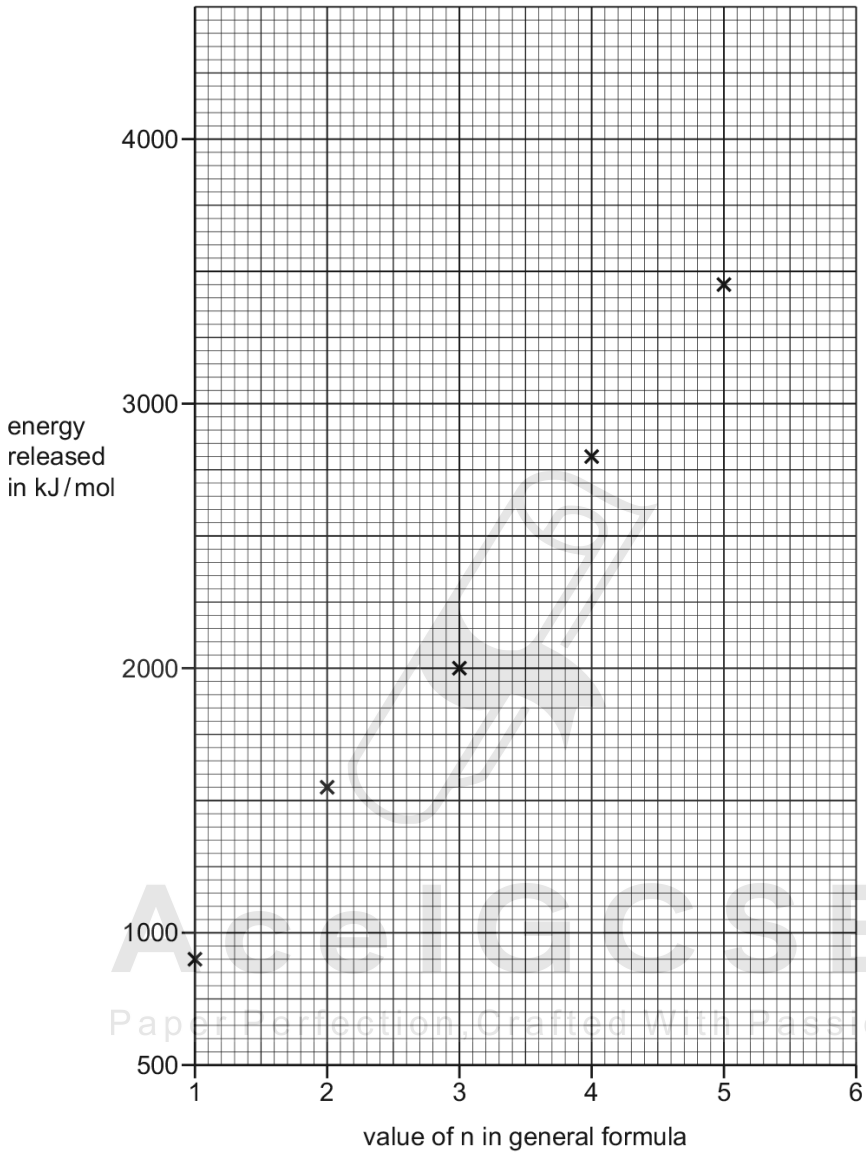
..... [7]

[Total: 7]

02. 0620_w15_qp_61 Q: 2

The alkanes are a homologous series of hydrocarbons which are used as fuels. Their general formula is $C_nH_{2n+2}$.
The energy released when equal amounts of the first five alkanes were burned was measured. The results are shown plotted on the grid below.






**(a)** Draw a line of best fit on the grid. [1]

**(b)** Suggest **two** reasons why not all of the points lie on the line of best fit.

1 .....

2 .....

[2]

**(c)** **Use your graph** to work out the amount of energy released when the same amount of hexane, $C_6H_{14}$, is burned. Show clearly how you worked out your answer.

..... [2]

**(d)** A student predicted that the energy released by burning butane would be two times the energy produced by burning ethane.

Suggest why she made this prediction and compare the values obtained for these two alkanes.

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..... [3]

[Total: 8]

01. 0620_s14_ms_61 Q: 6

same / measured volume of water (1)

initial temperature (1)

mass of nut(s) (1)

ignite / burn (1)
**not:** heat

for suitable time < 10 minutes / to completion (1)

final temperature of water (1)

repeat with other nut(s) (1)

compare / conclusion (1) max [7]

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02. 0620_w15_ms_61 Q: 2

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|---|---|---|---|
| (a) | straight line, drawn with a ruler, missing the point at n = 3; | **1** | |
| (b) | 2 from:<br>• measuring / recording error / anomalous result;<br>• equal amounts not burnt;<br>• heat losses;<br>• incomplete combustion; | **2** | **R:** human error<br>**I:** impurities |
| (c) | reading from the graph / expected answer 4100 ± 50;<br>indication of extrapolation from the graph; | **1**<br>**1** | |
| (d) | for butane n = 4, ethane n = 2;<br>value for ethane = 1550;<br>butane = 2800 / about twice value or not exactly twice value; | **1**<br>**1**<br>**1** | |