

Name .....

Mark

Class .....

Date .....

**GCSE Science/Chemistry**

**Internally Assessed Activity Unit C1b**

**Topic 7 – There’s One Earth**

**Fuels**

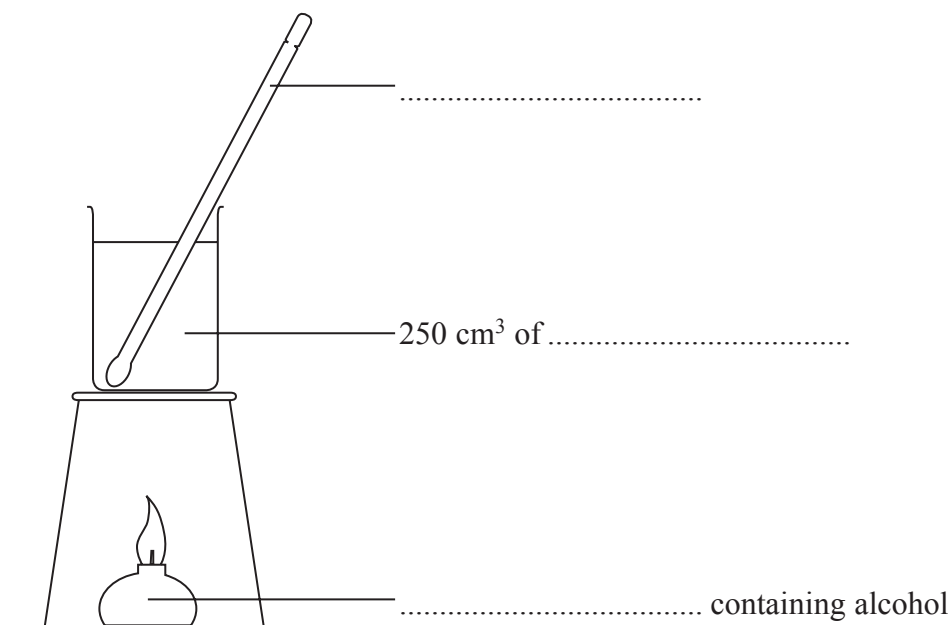
John and Mary are studying fuels. They know alcohol is used as a fuel for cars in some countries.

**Question 1**

They decided to find out which of four alcohols was the best fuel. They used this apparatus.

(a) Use the words from the box to label the diagram.

burner      thermometer      tripod      water



**3 marks**



(b) To find out how many grams of each alcohol were needed to raise the temperature of 250 cm<sup>3</sup> of water by 10 °C the following steps were carried out.

- first they found the mass of the burner and its contents.
- then they lit the burner and waited until the water temperature had gone up by 10 °C.
- they put out the flame, and found the mass of the burner and its contents.

The table shows their results.

alcohol	mass of burner + alcohol (g)		mass used (g)
	at start	at end	
methanol	178.26	176.79	
ethanol	210.31	208.29	2.02
propanol	197.74	195.74	2.00
butanol	231.25	230.29	0.96

(i) Complete the table to show the mass of methanol used.

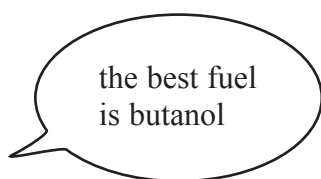
**1 mark**

(ii) Suggest why they should repeat their experiment.

.....

**1 mark**

(iii)



John says

Use the results of the investigation to explain why you think John reached this conclusion.

.....

.....

**1 mark**

- (iv) John said that butanol could be used as a major fuel, like petrol is today.  
Suggest **one** thing, which must be considered before butanol can be used as a major fuel.

.....

**1 mark**

- (v) Mary noticed that when one of the alcohols was burning it produced black smoke.  
Use words from the box to complete this sentence.

carbon	carbon dioxide	complete	incomplete
--------	----------------	----------	------------

The smoke was caused by ..... in the flame because the combustion

(burning) of the alcohol was .....

**2 marks**

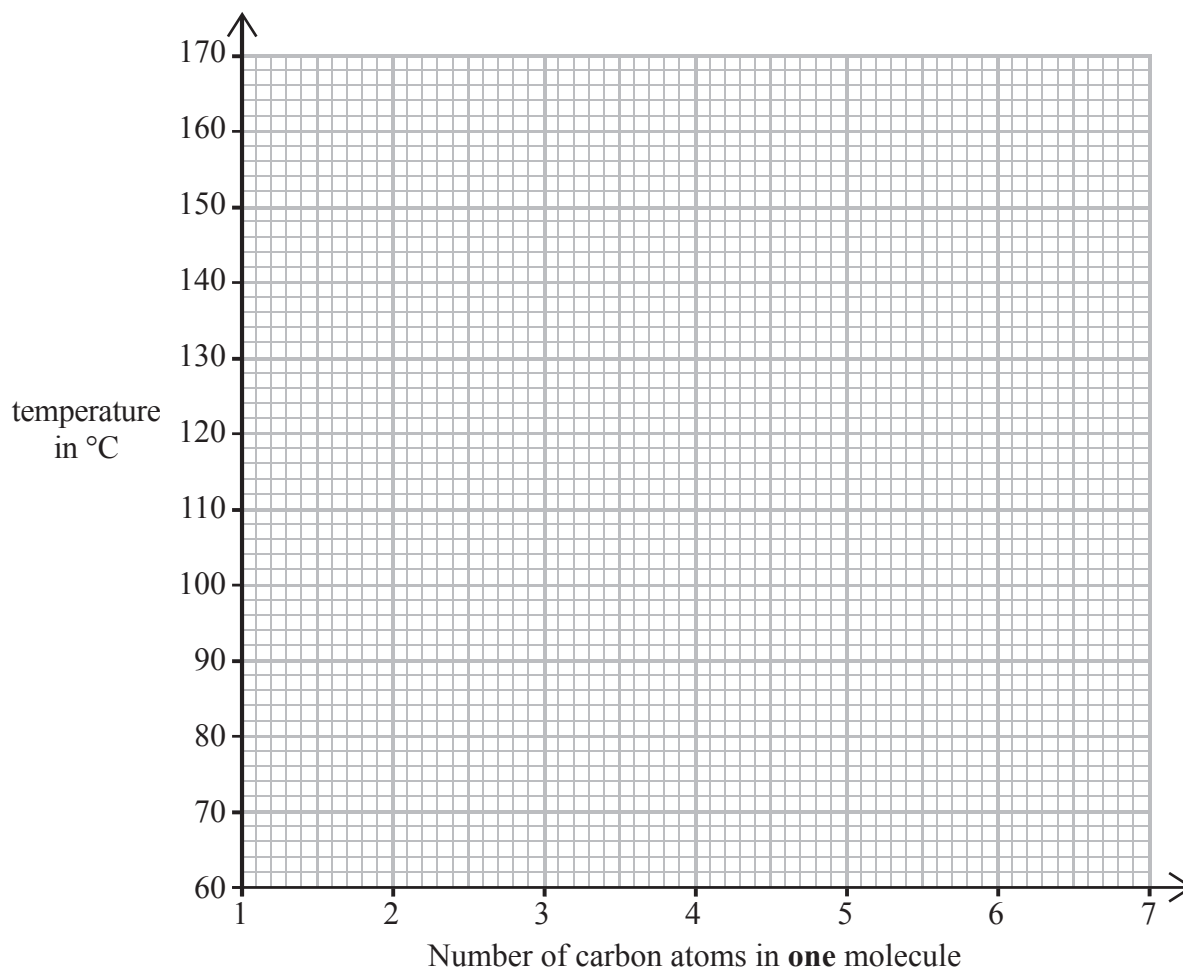
**(9 marks)**

## Question 2

Mary thinks that the boiling points of the alcohols could affect their use as fuels. She finds this information.

alcohol	number of carbon atoms in one molecule	boiling point (°C)
methanol	1	60
ethanol	2	78
propanol	3	97
butanol	4	117
hexanol	6	158

(a) Use this data to draw a line graph on the grid below.



**3 marks**

(b) Use your graph to estimate the boiling point of pentanol, which has 5 carbon atoms, in one of its molecules.

The boiling point of pentanol is .....

**1 mark**

**(4 marks)**

### Question 3

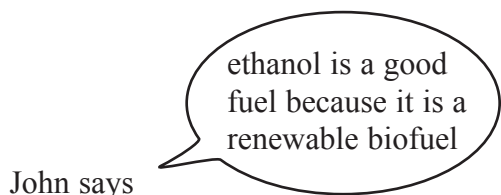
Many people think that we should find alternative fuels for cars, instead of using petrol and diesel.

(a) Explain why it is important to find these alternative fuels.

.....  
.....  
.....

**2 marks**

(b)



Explain what is meant by a **renewable biofuel**.

.....  
.....  
.....

**2 marks**

(c) Hydrogen can be used as a fuel for cars.  
State one advantage of using hydrogen rather than ethanol.

.....  
.....

**1 mark**

(d) Write the balanced equation for the complete combustion of ethanol,  $C_2H_5OH$ .

.....

**3 marks**

(e) A car manufacturer produced a video on the advantages of its hydrogen powered cars over cars which use petrol.  
Explain why some people could think that this video might be biased.

.....  
.....  
.....

**2 marks**

**(10 marks)**

