OCR
RECOGNISING ACHIEVEMENT

SPECIMEN

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE **A144**

SCIENCE A

Unit A144 (Controlled Assessment)

Practical Data Analysis

Information for Candidates

To be issued to candidates at the start of the task.

Information for candidates

You are going to carry out a Practical Data Analysis task to test the following hypothesis:

Different fuels transfer different amounts of energy when they burn because of the different numbers of carbon atoms in the fuel molecules.

Background

Today most transport in the world uses fossil fuels to provide the energy needed. This is not sustainable because

- fossil fuels are a non-renewable (finite) energy resource
- burning fossil fuels puts 'greenhouse gases' into the atmosphere.

Bio-diesel and bio-ethanol are renewable fuels.

The formula of bio-ethanol is C_2H_5OH.

Bio-diesel is a mixture of compounds. The formula of one compound found in bio-diesel is $C_{17}H_{31}COOCH_3$.

The table below shows that bio-diesel releases more energy per litre than bio-ethanol.

fuel	bio-diesel	bio-ethanol
energy released by 1 litre of fuel in kJ	32 000	22 000

It has been suggested that the difference in the amount of energy released when bio-diesel and bio-ethanol burn is because they have different numbers of carbon atoms in their molecules.

The hypothesis is therefore:

Different fuels transfer different amounts of energy when they burn because of the different numbers of carbon atoms in the fuel molecules.