Combustion of alcohols

The table below shows some information about the amount of heat released when different alcohols burn.

alcohol	number of carbon atoms	energy released (kJ/mol)	energy released (kJ/g)
methanol	1	726	22.7
ethanol	2	1367	29.7
propanol	3	2021	33.6
butanol	4	2676	36.1
pentanol	5	3329	37.7
hexanol	6	3984	39.0
heptanol	7	4638	39.9
octanol	8	5294	40.6

1. Draw a line graph of the **energy released in kJ/mol** against the **number of carbon atoms** in the molecule. The energy released should be the vertical axis, and the number of carbon atoms should be the horizontal axis.

   A sensible scale for the energy released is 1cm = 500kJ/mol.
   A sensible scale for the number of carbon atoms is 2cm = 1 carbon atom.

   Draw a line of best fit through the points.

2. Look at your graph. Write down what happens to the amount of energy released as the number of carbon atoms increases.

3. Estimate how much energy would be released by decanol, which has 10 carbon atoms.

The energy released in kJ/mol gives us an idea of how much energy each molecule of alcohol releases. However, it is often more helpful to know how much energy is released by a gram of fuel.

4. Draw a second line graph.
   This time, plot the **energy released in kJ/g** against the **number of carbon atoms** in the molecule. The energy released should be the vertical axis, and the number of carbon atoms should be the horizontal axis.

   A sensible scale for the energy released is 1cm = 5kJ/g.
   A sensible scale for the number of carbon atoms is 2cm = 1 carbon atom.

   Draw a line of best fit through the points.

5. Look at your graph. Write down what happens to the amount of energy released as the number of carbon atoms increases.

6. Estimate how much energy would be released by decanol, which has 10 carbon atoms.