Name _____ Period____

Fossil Fuels, Energy, and Carbon Emissions

For much of human history, we have been dependent on the burning of organic matter, such as wood and coal, as a fuel. In the past 100 years, the burning of petroleum based "hydrocarbons" has greatly accelerated. This is in large part, but not solely, due to the popularity of automobiles.

In the last thirty years, scientists have become concerned with the effect that the CO_2 produced from hydrocarbon combustion is having on Earth's climate. While it is unlikely that we will become free of our dependence on fossil fuels in the near future, it is possible to make choices about WHICH fossil fuels we use.

One of the considerations in choosing a fossil fuel is the amount of energy produced per unit of CO_2. In other words, it would seem to make sense to use the fuel that gives us the MOST ENERGY per mole of CO_2 released. The question is, which fuels fit this description? Complete the calculations on the back, and then answer the questions on the front of this paper.

Answer using COMPLETE SENTENCES.

1. Which hydrocarbon produced the greatest amount of energy per mole of the hydrocarbon burned? How much energy did it produce?

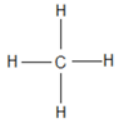
2. Which hydrocarbon produced the greatest amount of energy PER MOLE OF CO_2 produced? How much energy did it produce per mole of CO_2?

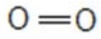
3. Based on your results, if all other factors are equal, should we burn hydrocarbons with short carbon chains, or hydrocarbons with long carbon chains? Justify your answer.

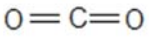
4. In reality, there are considerations other than the production of CO_2 that enter into our choices of fuels. Cite two other factors that we take into consideration when choosing a fuel to use.

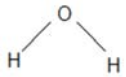
Use the equations and structures to find the energy change (ΔE) for each reaction. Divide that by the number of moles of CO_2 in the equation to find the Energy/CO_2.

CH_4 + $2\ O_2$ → CO_2 + $2\ H_2O$



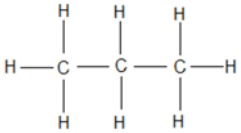


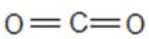




ΔE =	kJ
$\Delta E/CO_2$ =	kJ

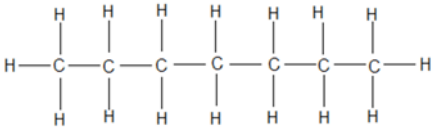
C_3H_8 + $5\ O_2$ → $3\ CO_2$ + $4\ H_2O$

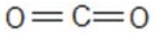




ΔE =	kJ
$\Delta E/CO_2$ =	kJ

C_7H_{16} + $11\ O_2$ → $7\ CO_2$ + $8\ H_2O$





ΔE =	kJ
$\Delta E/CO_2$ =	kJ