

WHERE MOST OF OUR ENERGY HAS COME FROM SO FAR

Most of the energy we use is produced by burning fossil fuels. These come from living things that died many millions of years ago. Their remains were buried in the Earth, and were formed into the fuels we use today by the high temperatures and pressures underground. Coal was formed mainly from giant fern-like plants that lived in prehistoric forests. Oil was formed mainly from marine organisms that lived in the shallow seas which covered large areas of the world. Natural gas was also formed from prehistoric remains and gas is often found above oil deposits.

The burning of a fuel to release energy can happen in one of two ways – with or without flames. Petrol burns with a flame to provide energy. Food is “burned” without flames during respiration. Three things are necessary for a fire – fuel, oxygen and heat. These three form the fire triangle. If any one of these is removed, the fire will go out.

Fossil fuels contain carbon and carbon compounds.

Coal is mainly carbon. A hydrocarbon is a compound of hydrogen and carbon. Natural gas is mainly the hydrocarbon methane. Oil is a rather complicated mixture of hydrocarbons.

When a compound burns the products are usually the oxides of the elements in the compounds.

When a fuel reacts with the oxygen in the air, heat is given out. A reaction that produces

heat energy is called an exothermic reaction. There are three main types of coal: lignite, which is brown and soft, bituminous coal - much older than lignite - which is black and crumbly, and anthracite - the oldest form of coal - which is hard, black and shiny.

Crude oil, as it comes out of the ground, is not much use as a fuel. The oil is a complicated mixture of hydrocarbons. The work of an oil refinery is to separate the oil into simpler mixtures and to increase the proportion of the more useful hydrocarbons.

The separation of the oil is done by fractional distillation. This is a way of separating a mixture of liquids with different boiling points. The different hydrocarbons in the oil all have different boiling points.

Fractional distillation is one of the main processes that take place at an oil refinery. This is done using a special fractionating column. The second important job of an oil refinery is to try and break down some of the larger, not so useful compounds into the smaller, more useful ones. This process is called cracking. Sometimes an additional process called reforming is carried out. In this process the arrangement of the atoms in a molecule is altered in order to produce a more useful substance.

Fuels are burned to produce heat and light energy. At home we can also use electrical energy to produce both heat and light. It is also possible to produce electrical energy from chemical reactions.

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Answer these questions about Where most of our energy has come from so far.

- a. Where do fossil fuels come from?
- b. How were they formed?
- c. Where does coal come from?
- d. Where does oil come from?
- e. Where does natural gas come from?
- f. What is necessary for a fire to burn?
- g. How can a fire be put out?
- h. What do fossil fuels contain?
- i. What are the products of the burning of a compound?
- j. What are the three main types of coal?
- k. What is crude oil made up of?
- l. What is fractional distillation?
- m. What is cracking?
- n. What is reforming?

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Use these words to complete the following concise summary of Where most of our energy has come from so far: boiling points, carbon, carbon dioxide, carbon monoxide, cracking, fossil fuels, hydrocarbons, oil refinery, poisonous.

The three main (1) are oil, natural gas and coal. These fuels all contain the element (2) and so when they burn (3) is formed. If there is not enough air some (4) may be formed. This is dangerous because it is very (5) Oil is a complex mixture of (6) It can be separated into different fractions because the different compounds have different (7) This separation is done at an (8) Another process that takes place is (9) which involves breaking larger molecules into smaller more useful ones.