

DAY 7

TOPIC: CARBON AND FUELS.

Oil and Carbon

Aims :

- Explain how oil is formed.
- Explain the process of fractional distillation.
- Name the products of fractional distillation and their uses.

Activity 1:

- Watch videos V.1,V.2, V.3, V.4,V.5, V8 & V.9
- Read attached pages 59 & 60 and answer the questions below.

Questions

1. What is oil formed from?
2. Explain how oil is formed?
3. What is crude oil?
4. Why can't crude oil be used as a fuels
5. What is fractional distillation?

6. Explain how fractional distillation is carried out.
7. Name the 6 products (fractions) of fractional distillation in order, starting with the one with the lowest boiling point.
8. For each product (fraction) above (Q.7), write down one use.
9. Some of these fractions contain valuable chemicals. Name 3 things that can be made out from these chemicals.

12.5 Fuels from the Earth

Starting
off 1

Coal This is how scientists think that coal was formed: Millions of years ago large areas of Britain were swamps. Thick forests grew there. When dead trees fell into the swamps, they were buried by mud.

The mud kept the air out and so the trees did not rot away. As time passed, however, the woody material did change. As the mud piled up, the trees were squashed together. Heat from inside the Earth also affected them. The trees were changed into coal.

Now much of this coal lies deep underground, covered by large amounts of sediment. To mine these underground coal seams, deep shafts have to be sunk. Some coal seams, however, have been pushed towards the surface. This coal can be mined more easily once the surface rock has been bulldozed away.

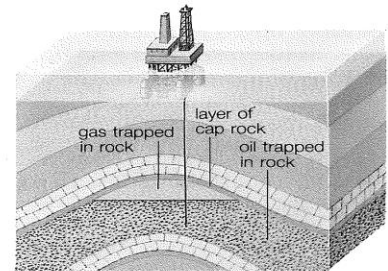
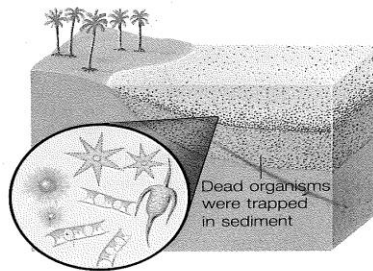
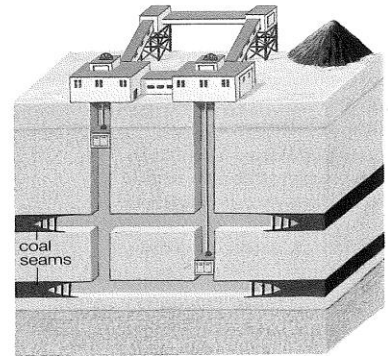
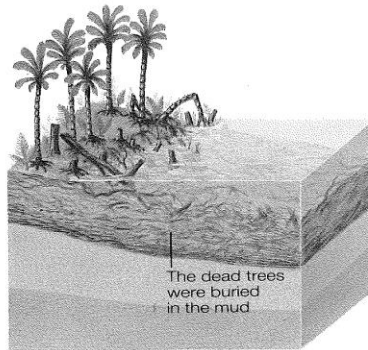
Oil This is how scientists think that oil was formed:

Long ago, the North Sea was warmer and shallower than it is now. Countless millions of tiny animals and plants lived in it. When these organisms died, their bodies fell to the sea bed. There they were trapped in sand and mud which formed as sediment.

Pressure changed the sand and mud to sandstone and mudstone. Pressure, and heat, changed the organisms to oil and gas.

The underground pressure forced the oil (and gas) upwards, through the rock. Some oil escaped to the surface, but in many places it was trapped under layers of **caprock** which did not let it through. These areas are now oilfields. The oil is trapped as tiny drops between the rock grains. When an oil rig drills through the caprock, the oil is released.

- 1 a) What were coal and oil formed from? ▲
b) How were these fuels formed? ▲
- 2 Why is coal a fossil fuel? Name another fossil fuel. ▲
- 3 Oil is not found in underground pools. How is it found? ▲
- 4 Sometimes, oil can rise to the surface without pumping. Suggest why this happens.
- 5 The energy stored in coal came from the Sun. Explain this.
- 6 **Try to find out:** a) what peat is, and how it was formed
b) which countries have large coalfields or oilfields.



Did you know?

- Coal is called a **fossil fuel** because it was made from things which lived on the Earth long ago.
- The oil which comes out of the Earth is hot. It can be as hot as 80°C.

Starting
off 2

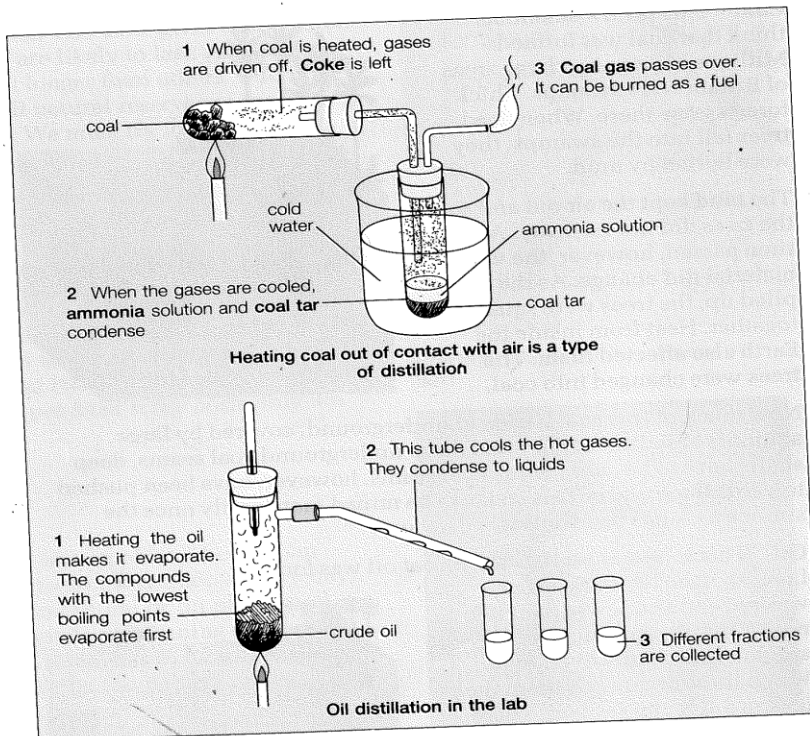
12.5 Not only for burning

Coal which is mined is mostly burned as a fuel. But coal can be used to produce chemicals instead of energy. When it is heated out of contact with air, coal produces:

coal gas (used as a fuel)
ammonia (used to make fertilisers and explosives)
coal tar (used for making drugs, dyestuffs, and plastics)
coke (used in steel making)

Crude oil from the well can't be used as a fuel. It's a black smelly liquid containing lots of compounds mixed together. These compounds have to be partly separated before they can be used. This separation is done by **distilling** the oil in a **refinery**. The compounds all have different boiling points. By evaporating the oil, then gradually condensing the gases, the oil is split into fractions like petrol and diesel. Each fraction is useful because it contains compounds which have roughly the same boiling points.

Many of the oil fractions are burned as fuels. But, like coal, many contain valuable chemicals, used for making plastics, drugs, dyes, detergents, and much more.



Did you know?

- Oil can be made from coal.
- One of the oil fractions can be converted into protein, a much needed foodstuff. This is done by tiny micro-organisms which feed on the oil.

- 1 Which chemicals can be made from coal? What are they used for? ▲
- 2 What happens to oil when it is distilled? ▲
- 3 Crude oil can't be used as a fuel. Petrol can. What's the difference?
- 4 Why do plastics get dearer when the price of oil goes up?
- 5 Burning coal and oil is useful, but in a way it is wasteful. Give reasons for and against burning these fuels.
- 6 Using the oil refinery diagram: a) write down four oil fractions and their uses b) put all the fractions in order, with the fraction of lowest boiling point first and the one with highest boiling point last.

