

## Chapter 3 What's oil the fuss about?

### Activity guidelines

#### Chapter aims and learning intentions

- To consider how much our lives in Britain today are dependent on oil and other fossil fuels.
- To uncover the amount of oil and other fossil fuels used in the production and transportation of everyday products in today's society.
- To put into historical context how recently the "oil dependency" culture developed.
- To understand how changing lifestyles, both locally and globally, are increasing demand on resources.
- To make the link between lifestyle choices and climate change.

#### Activity 1 Now and then.

This activity asks pupils to consider their lifestyles as an introduction to the concept of an oil dependency culture.

- Pupils answer a series of apparently random questions about them and their lives, on the worksheet Now and then.
- Once they have answered the questions about themselves individually, encourage them to pair up and think about what answers might have been given by children in the 1950's.
- Discuss the **reasons** for the different answers.

#### Activity 2 Oil Detectives

This activity aims to build an understanding of how prevalent oil is in our lives today. It can be completed in pairs and involves the whole classroom.

- Images have been provided of a range of products (see list below and Resource sheet 1). These images can be produced as separate pictures and placed around the classroom.
- The activity can be introduced in a variety of ways. One suggestion is to begin by showing the group a couple of "things" from the list which have a hidden link with oil. Good examples may be:
  - a) **The banana** to illustrate how oil is used in agriculture and transportation.
  - b) **Something made from plastic** to illustrate how oil is made into plastic by heating the oil to high temperatures in order to make different length hydrocarbons.
  - c) **A vehicle** to illustrate how oil is used in both manufacture and transportation, using oil based fuels such as petrol and diesel.
- After an introduction pupils can work in pairs to visit each of the images and complete the table (oil detectives worksheet). A completed table has been provided (see below).
- This would be an ideal time to explain the idea of peak oil and the concept that we may not be able to use oil in the same quantities in the near future. (See teacher notes for support with this.) Pupils are asked to look around the classroom and to identify anything which has not used oil at some point in its production or transport. This can be extended to a homework activity looking around the home.

Extension activity ideas to develop this thinking further:

- Pupils keep an “oil diary” for a day. They note all the ways in which they have used oil and products made from oil (or as many as they can). This can be presented visually, written as a day-in-the-life extract, or simply compiled as a list.
- Pupils are asked to think about the changes that will affect their life if (or when) oil can no longer be used in such quantities. What things would they miss the most? What would they be most concerned about? Is there anything that they would be prepared to give up and accept that they can no longer have or do this? What are going to be the hardest things to find oil substitutes for?

List of the 15 products used within activity 2:

Pot of Vaseline	Box of shredded wheat
SMEG fridge	mp3 player
Burger in a carton	Plastic recycling box
Banana	Carpet
Joint of New Zealand Lamb	CD
Petrol – electric Toyota Prius	Laptop
Tube of toothpaste	Tumble dryer
Sports trainers	

### Activity 3 Oil in my life

This activity applies and develops the understanding gained during activities 1 and 2, asking some more open and challenging questions about oil and our lifestyles. The tasks can be completed individually or in pairs, with whole class discussion.

- Pupils study the image of the WEEE sculpture (resource sheet 2) and think about what questions it makes them want to ask. These can be shared and explored as a class, with those chosen as the best ones used as a discussion base or set for further research or personal reflection.

New EU ‘take back’ legislation means that the components of this sculpture are now the responsibility of the parent company, rather than the customer. The company is required to collect and dispose of, or re-use and recycle, such products at the end of their use. This is an interesting point to raise with pupils, to gauge their reactions and discuss some of the ways in which this is a positive step forward.

- Pupils now apply the understanding gained from activities 1 and 2 to help them fill in the worksheet entitled How has the discovery of crude oil influenced your life? The completed version of this worksheet (see below), provides some examples which may be useful as prompts to aid pupil thinking.
- To draw these ideas together and make the link with climate change pupils use the What exactly is the link? worksheet. Pupils study the images and complete the activity on the sheet.

### Chapter 3 What's oil the fuss about?

#### Activity 3 Oil detectives Teacher answer sheet

Product	Oil in final product?	Oil used in manufacture of this product?	Oil based fuel used in transportation?	Power?
Lip balm	Vaseline is a petroleum based product. Often comes in a plastic pot.	Oil powered machinery during production phase	Yes, it is made in other countries by the multinational company Unilever.	
Shredded wheat	Plastic inner packaging.	Oil based fuel runs agricultural machinery. Fertilisers and pesticides made using oil.	Most of our wheat is imported from the USA.	
Fridge - freezer	Plastic front on doors. Plastic shelves. Often packaged in plastic and polystyrene.	Oil powered machinery during production phase.	Many fridges are made overseas and transported by container ship.	✓
mp3 player	Plastic and other components made using oil. Often packaged in plastic and polystyrene.	Oil powered machinery during production phase.	Yes, made by multinationals in countries such as Taiwan.	✓
Burger	Polystyrene cartons.	Oil based fuel runs agricultural machinery. Fertilisers and pesticides made using oil.	Refrigerated transportation of meat and other ingredients.	
Recycling box	Recycling tub is made of plastic.	Oil powered machinery during production phase.	Where was your recycling tub made?	
Banana	Often in super markets they are packaged in plastic.	Oil based fuel runs agricultural machinery. Fertilisers and pesticides made using oil.	Most bananas come from the tropics and are transported by air or ship.	
Carpet	Most carpets contain a synthetic rubber backing which is oil based. Acrylic fibres are often oil based.	Oil powered machinery during production phase	Yes, carpets are made in countries including the USA, Belgium, Holland, China and within the Middle East.	
New Zealand lamb	Often in supermarkets they are packaged in plastic and polystyrene.	Oil based fuel runs agricultural machinery. Fertilisers and pesticides made using oil.	Refrigerated transportation by air or ship requiring large amounts of fuel.	✓
Compact disc	Made of plastic. Plastic casing.	Oil powered machinery during production phase.	Yes, many CD's are pressed overseas, the majority in South Asia.	✓
Hybrid car - Toyota Prius	Contains lots of plastic components. Tyres are an oil based product.	Oil powered machinery during production phase.	Transportation mainly by container ship requiring source of fuel.	✓
Laptop	Contains lots of plastic components. Synthetic carrier case is likely to be oil based.	Oil powered machinery during production phase.	Transportation by air or ship requiring large amounts of fuel.	✓
Toothpaste	Plastic casing. May contain oil based ingredients such as detergents and foaming agents.	Oil powered machinery during production phase.	Yes, made by multinationals in countries including China and South Africa.	
Tumble dryer	Contains lots of plastic components, and some rubber components.	Oil powered machinery during production phase.	Transportation mainly by container ship requiring source of fuel.	✓
Trainers	Likely to contain synthetic rubber soles and probably synthetic uppers.	Oil powered machinery during production phase.	Yes, made by multinationals in countries including Indonesia, Vietnam and Bangladesh.	

## How has the discovery of crude oil influenced your life?

### Things I have at home?

We have televisions and DVD players made using oil and transported from around the world.  
All the kitchen appliances were made using oil as an ingredient somewhere.  
Our furniture is made from synthetic fibres which have oil in them.  
Our carpets were made partly from oil, as was the paint used for decorating.

### Where I go on holiday?

MY family drives to Cornwall and Scotland every year.  
We fly to Europe several times a year.  
We have flown to America and Australia.

### What I eat?

Most of our food comes from the supermarket, and arrived there by lorry.  
A lot of the food I like comes from other countries and has travelled by air or sea.  
We have a freezer full of food at home.  
I can eat strawberries all year round because they can be transported from other countries.  
Oil was used in the growth and production of this food, in fertilisers and to make and operate the machinery.



### Things I buy?

Everything that I buy to do with music was made using oil as an ingredient.  
A lot of things I buy are partly made from plastic, which is made from oil.  
Many things I buy were made overseas and have travelled here using petrol and diesel.

### What I wear?

Most of my clothes have been made using oil as an ingredient.  
The machines which made my clothes use oil to make them work.  
Most of my clothes were made in other countries and transported here using petrol or diesel.

### Other

Our house uses oil fired central heating.  
My asthma pump was made using oil.  
Hospitals are full of equipment and medicine which was produced using oil.  
My uncle works on the North Sea oil refineries.

### Things I do in my leisure time?

I love music and all my CDs and my mp3 player are made using oil.  
The cinema is full of things which are made using oil, including the film itself.  
I go into town on the bus which uses diesel.  
I like shopping and most things I buy were made using oil.  
My mountain bike tyres were made using oil.

## Chapter 3 What's oil the fuss about?

### Teacher notes and background information

- Aims
- Background information
- Web links

#### Background information and aims behind this chapter

The purpose of this chapter is to enable young people to understand how burning oil and fossil fuels has become central to all aspects of our current lives, and to consider the implications of this. The range of activities and stimuli encourages them to explore how pervasive oil in particular has become in the production, manufacture and transportation of such a huge range of commodities. The chapter also examines how this directly links with climate change.

#### Making the link between oil and climate change.

The first two activities enable students to understand how much the discovery and widespread use of oil has changed people's lives in Britain and around the world over the last 50 to 100 years. The obvious "benefits" are identified, such as the introduction of labour saving devices in the home, greater choice of foods and more opportunities for trade and travel. It is important that the students are also given the opportunity to consider the far reaching economic, environmental and social consequences which have also arisen from this.

#### Key points to draw out

1. Oil is "made" into different products like plastic, polystyrene, diesel, petrol and detergent bases through a process called fractional distillation. This involves heating the oil to very high temperatures and emissions of carbon dioxide and other gases are given off during this process.
2. Oil has revolutionized global trade. Products and people are regularly transported thousands of miles around the world. This has led to a massive demand for cheap petrol, diesel and aviation fuel, which again emits carbon dioxide when burnt.
3. Our access to relatively cheap plastic products has encouraged a "throw away" culture. Most of our waste in Britain goes into landfill and emits large quantities of greenhouse gasses, particularly methane.
4. There has been a massive increase in demand for electricity to power new products. Almost without exception, these "new products" are oil based.
5. In Britain today, the majority of electricity comes from fossil fuels, provided by coal, gas and oil fired power stations. These fuels are "burnt" in order to produce steam or gases to power an electricity turbine. Burning these fuels emits greenhouse gases including carbon dioxide dioxide.

6. In Britain just three percent of our electricity comes from renewable sources, such as wind, wave, hydroelectric and solar power, which do not emit greenhouse gases.
7. We may now have reached “peak oil”, meaning that we have reached the peak of cheaper, easily available oil supplies. From now on supplies are likely to become more expensive and ultimately scarce.

These links and consequences can be explained with the aid of the support resources such as the WEEE man image and the newspaper cuttings which highlight some of the consequences of climate change. These consequences are further explored in chapters 4 and 5.

## Background information about oil

### A What is oil and how is it formed?

This information has been largely sourced from the following website:

[www.resources.schoolscience.co.uk/ExxonMobil/infobank/4/2/index.htm?origin.html](http://www.resources.schoolscience.co.uk/ExxonMobil/infobank/4/2/index.htm?origin.html)

Crude oil was made over millions of years from tiny plants and animals, called plankton. The plankton that lived in the Jurassic period made our crude oil. This was the time of the dinosaurs. It was about 180,000,000 years ago.

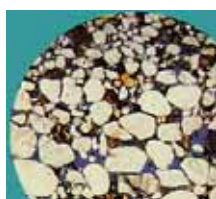


Living plankton under a microscope (about 150 x bigger than real life).

When plankton die they fall to the bottom of the sea. The plankton are trapped under many layers of sand and mud. Over millions of years, the dead animals and plants get buried deeper and deeper. The heat and pressure gradually turned the mud into rock and the dead animals and plants into oil and gas. This process takes millions of years.

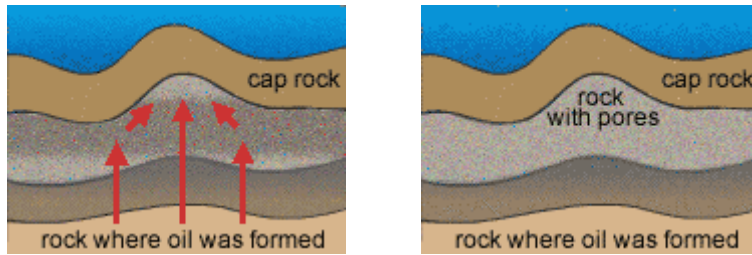


Some rocks have tiny spaces called **pores**, which can hold the oil like water in a sponge. Oil can float up through the tiny spaces in the rock and may eventually escape into the sea.



Microscopic image of sandstone. The tiny spaces, called pores would have held the oil like a sponge. The pores have been stained blue.

In some places, a layer of impermeable rock may be laid down on top of the porous rock. This is known as the cap rock and stops the oil from escaping. Over millions of years all the rocks will move and may fold. Sometimes they form a dome, which is where the oil accumulates. The oil companies can drill into this rock to recover the oil.



## B Who discovered oil and when?

This information has been largely sources from the following website:

[www.seed.slb.com/ga2/FAQView.cfm?ID=906](http://www.seed.slb.com/ga2/FAQView.cfm?ID=906)

Natural oil seeps have been present since before the days of dinosaurs about 200 million years ago. Lighter oils evaporate in air leaving behind the heavier oils in “tar pits”. People have used this naturally occurring oil since the beginning of recorded human history. Oil can also be made from animal fat, and it is not always clear whether mention of oil in ancient records refers to oil from the ground or from animals.

Ancient Greek texts describe how they would pour oil onto the sea to set fire to their enemies' fleets. The Bible refers to a thick form of oil called "Pitch" which was used to waterproof Noah's ark and the baby Moses' basket. The American Indians also used pitch to waterproof canoes and to make war paint and medicines. These examples are probably uses of oil from the ground.

The word “Petroleum” comes from the Greek word for rock and the Latin for oil or fat. It literally means “oil that comes from rock”.

Petra / petros (Greek) = rock oleum (Latin) = oil / fat

Crude oil was pumped from the ground in Sichuan, China, 2500 years ago, but the history of oil wells as we know them today is much younger.

A brief history starting in 347 A.D:

347 Oil wells are drilled in China up to 800 feet deep using bits attached to bamboo poles.

1264 Mining of natural oil seeps in medieval Persia is witnessed by Marco Polo on his travels through Baku.

1500's Seep oil collected in the Carpathian Mountains of Poland is used to light street lamps.

1594 Oil wells are hand dug at Baku, Persia up to 35 meters (115 feet) deep.

1735 Oil sands are mined and the oil extracted at Pechelbronn field in Alsace, France.

1815 Oil is produced in United States as an undesirable by-product from brine wells in Pennsylvania.

1848 First modern oil well is drilled in Asia, on the Aspheron Peninsula north-east of Baku, by Russian engineer F.N. Semyenov.

1854 First oil wells in Europe are drilled 30- to 50-meters deep at Bóbrka, Poland by

Ignacy Lukaszewicz.

Oil historians in the USA give credit for the first modern commercial oil well to Colonel Edwin L. Drake. His well reached a depth of 22m (72-ft). It was drilled in "Oil Creek" near the town of Titusville, slightly east of Pittsburgh, Pennsylvania, USA and started producing oil on August 28, 1859. There were no automobiles in those days. The main market for petroleum was for medicine. It was called Rock Oil and sold for about \$40 a barrel, which is about the same as a barrel of oil costs today, so it would have been worth a lot of money in 1859.

There are several other claims for "the first oil well", including a well drilled in 1858 in Wietze, Germany. This area, locally nicknamed "Little Texas" now houses a petroleum museum (the Deutsches Erdölmuseum). The first offshore oil well was in the bayous (swamps) of Louisiana, USA during the 1950s. The first drilling in open sea was done in 1955 for Shell Oil in the Gulf of Mexico just south of New Orleans. This used a barge with a drill rig attached named "Mr. Charlie", which continued to drill in the Gulf of Mexico for 32 years.

### **C Peak Oil – another big reason that our consumer lifestyles are under threat"**

"Thinking green is not about being hysterical, but there are big changes afoot and we need to prepare ourselves for a new reality. Climate change is only one reason that our consumer lifestyles are under threat." Steve Jones freelance environmental consultant.

Is oil the elephant in the room? The world is heading for an energy shock. We are very reliant on this one key resource to feed our energy hungry lifestyles, and we have used up much of the more easily accessible supply. The best quality oil is light and low in sulphur and easy to pump, easy to process and yields an incredibly energy dense fuel. But this is in short supply. Increasingly, the remaining reserve has to be pumped from the ground under pressure with expensive specialist equipment - it is thicker, heavier, harder to use, more costly to process and yields less energy. In addition, with surging global demand, energy prices are set to rocket.

Whilst global oil demand surges ever higher (1,000 barrels a second) the big easy-to-find oilfields full of light crude oil have all been found already. We have been consuming oil faster than we have been finding it since the 1980's and, recently only smaller fields of lesser quality have been found. Furthermore, we have used up the oil reserves close at hand. USA and UK oil production peaked years ago, so we have become reliant on getting our most important resource from far away and increasingly unpredictable places.

Whatever energy alternative we might choose as a replacement, it is going to take many years to develop sufficient supplies to fill the gap left by oil and other fossil fuels. Government policies concerning developing renewable energy supplies and the future development of the nuclear power industry are obviously crucial to this, and very controversial.



## Acknowledgements

Images sourced from [www.flickr.com](http://www.flickr.com)

### Chapter 3 What's oil the fuss about?

#### Activity 2 Support resource 1

Vaseline	by chocolategirl64
Cereal	by 'one'
Fridge	by chiefmoamba
Prius	by Roadsidepictures
Ipod	by Brapke
Burger	by wEnDaLicious
Re-cycle bin	by practicalowl
Banana	by Enrico Fuente
Carpet	by ToniVC
Cd	by deovolenti
Lamb	by ulterior epicure
Tumble dryer	by ennor
Laptop	by Steve A
Trainers	by cowboyuk80
Toothpaste	by Lasre

### Chapter 3 What's oil the fuss about?

#### Activity 3 Oil in my life

WEEE man	by ebeth
Desk clutter	by Ben Ward
Polar bear	by Alistair Rae

### Chapter 3 What's oil the fuss about?

#### Activity 1 Now and then

#### Now and then worksheet

	My answer	The answer I think children in the 1950's would have given	Is the answer the same or different?	Why ...
1) What did you have for breakfast this morning?				
2) Choose an item of clothing you are wearing today. What material is it made from?				
3) Look at the label on another item of your clothing. Where was it made?				
4) How did you travel to school today?				
5) Do you have central heating at home?				
6) Think about the chair you are sitting on – what is it made from?				
7) Where do you go to do your weekly shop?				
8) Do you have a television at home?				
9) Have you ever been on a plane?				
10) Have you ever eaten at a fast food restaurant?				

### Chapter 3 What's oil the fuss about?

#### Activity 2 Oil detectives

Name each product and then tick the boxes where you can detect the oil.

Product	Oil visible in final product?	Oil used during manufacture?	Oil used in transportation?	Oil used as source of power?
1 Lip balm	no	✓	✓	no
2 Shredded Wheat				
3 Fridge - Freezer				
4 mp3 player				
5 Burger				
6 Recycling box				
7 Banana				
8 Carpet				
9 New Zealand lamb				
10 Compact disc				
11 Toyota Prius				
12 Laptop				
13 Toothpaste				
14 Tumble dryer				
15 Trainers				



**Chapter 3 What's oil the fuss about?**  
**Activity 2 Support resource 1**





## How has the discovery of crude oil influenced your life?

Things I have at home?

Where I go on holiday?

What I eat?

Things I buy?



Things I do in my leisure time?

What I wear?

Other



**The amazing RSA WEEE man – a seven metre tall, 3.3 tonnes giant robotic figure made from old televisions, mobile phones and washing machines .**The sculpture, designed by Paul Bonomini, represents the amount of Waste Electronic and Electrical Equipment (WEEE) that one average person in the UK throws away in their lifetime. The RSA WEEE Man is an awareness and education project to highlight the growing problem of WEEE in the UK and across Europe

**What exactly is the link between the 2 photos?**

“Products themselves do not pollute: it is the factories that made them, the trucks that transported them, the user who uses them and the incinerator that burns them”.

**Choose 5 things from photo A and explain why you think they are linked to photo B**



**Photo A**



**Photo B**