



# workshop 1

## coal gas – from raw material to consumer

teachers' notes

### What happens on the tour?

The class will be shown around the gasworks and introduced to the process of making coal gas. They will find out what raw/natural materials were used in the process and what man-made products were produced. They will learn how Northern Ireland was, and is, dependent on other parts of the UK for natural resources. They will learn about the different ways in which consumers used the gas and the benefits it brought to society.

### What happens in the workshop?

In teams, the pupils will take part in a quiz to distinguish between natural and man-made objects.

They will look at how coal is formed in the earth and order the steps of this natural process. This will be related to the availability of coal in Northern Ireland, which necessitated its transport from Britain to the gasworks.

Pupils will be introduced to the idea that gas is hard to store. They will be asked to propose methods of storing gas. Volunteers will take part in a 'Big Breaths Battle', which demonstrates gas storage and can introduce the concepts of gas volumes and simple respiration.

Pupils, in their teams, will be provided with craft materials to produce a picture of one stage of the process of making coal gas. A volunteer from each group will provide a brief description of their picture.

### How does this relate to the Key Stage 2 curriculum?

#### The world around us:

- To find out about the origins of materials
- To learn that some materials are natural and others are manufactured
- To sort natural and man-made objects
- To recognise a fair test
- To suggest ideas for storing gas
- To measure volumes of trapped gas
- To investigate simple respiration
- To learn about the stages in the preparation and journey of a product from raw material to the consumer
- To use maps to find towns that had a gasworks
- To understand how Northern Ireland is dependent on other parts of the UK for natural resources
- To understand the cost implications of transporting a heavy raw material
- To create pictures that represent the process involved in gas production

### What skills are involved?

Working with others, discussion, sequencing, picture drawing, classifying, making observations, asking and answering questions, creativity, communication, numeracy, recording data, interpreting data and planning a fair test.

1.1

# natural and man-made

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Put a green tick in the box below the natural objects. Put a red cross in the box below the man-made ones.



Coal



Wood



Soft drink can



Soap



Paper bag



Plastic toy



Seeds



Jumper



Fossil



Apple



Chemical fertiliser



Sand

Q What natural resource is used in the gasworks? \_\_\_\_\_

# 1.2

## formation of fossil fuels

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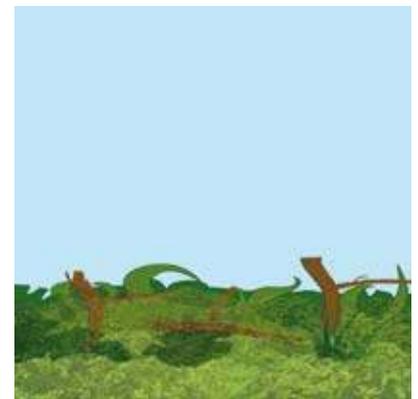
Have a look at the following pictures and their descriptions. Put the story of the formation of fossil fuels in order by numbering the boxes above the pictures.



Millions of years ago the earth was partly covered with swampy forests. Trees and plants used the sun's energy to grow.



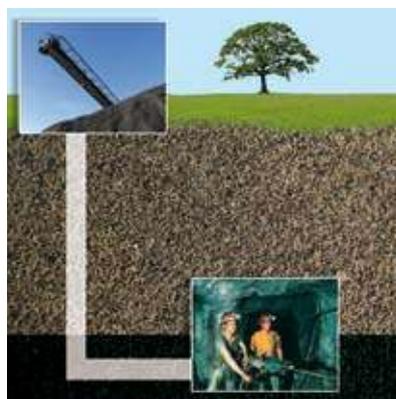
Eventually the sand layers became very thick and heavy. They squashed the plant material into a hard layer.



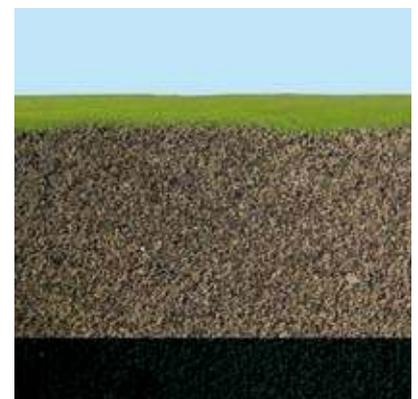
When the trees and plants died they sank to the bottom of the swamp. Over time, a thick layer of dead plant material built up.



Sand from rivers washed over the layer of dead plant material.



Miners dig deep into the earth to find the coal.



After millions of years of being deep underground and, heated by the earth's forces, the plant material was transformed into coal.

# 1.3

## products made at the gasworks

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Use the words in the box below to complete these sentences:

brushes	cooked	coke	tar
lights	homes	gasholder	



Inside the airtight retort coal was \_\_\_\_\_ at temperatures of 1200°C. The process produced gas and turned the coal into \_\_\_\_\_. This was recycled as fuel to heat the retorts or sold to local houses and factories.



The gas had to be cleaned before it could be used. \_\_\_\_\_ was cleaned out of the gas in a number of ways but the last traces were removed by scrubbing with big \_\_\_\_\_. It was collected and used to make lots of different chemicals.



When the gas was cleaned it was stored in the \_\_\_\_\_ before being piped to street \_\_\_\_\_ and \_\_\_\_\_.

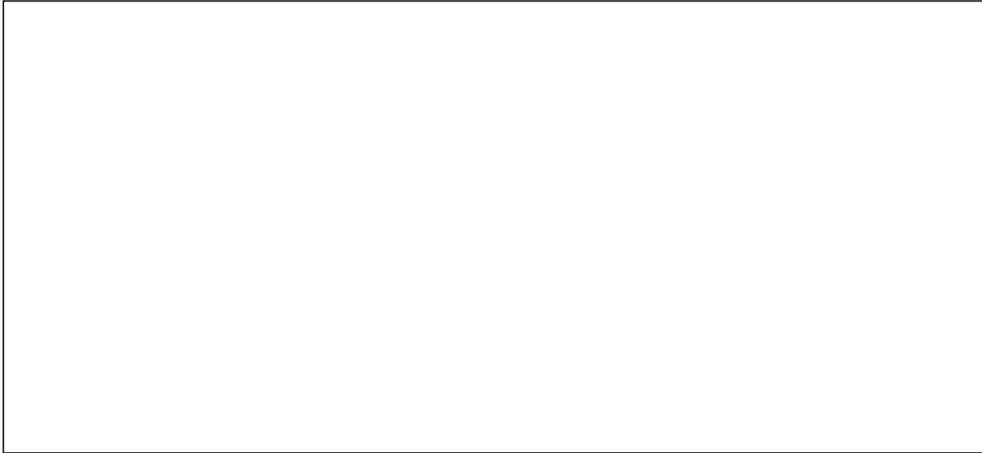
# 1.4

## From raw material to consumer

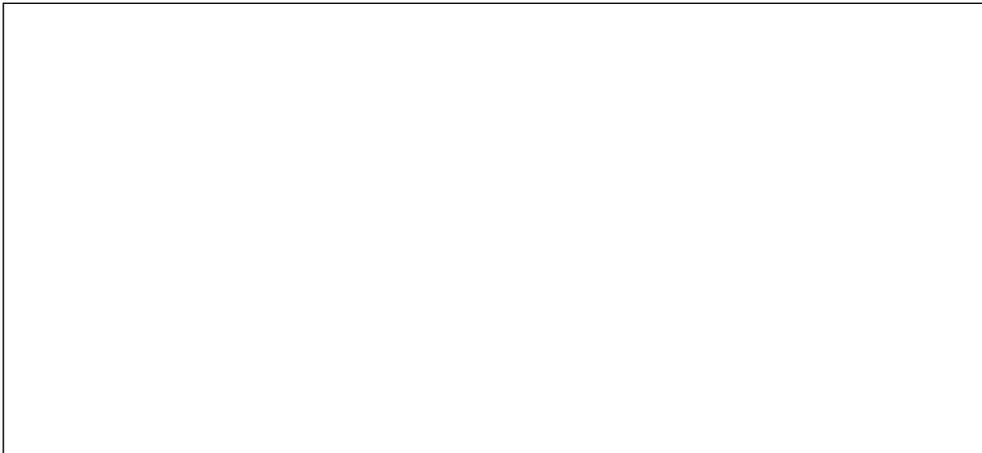
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Draw a picture in each of the boxes below to show what you have learnt about how coal gas was made and how it was used.



Draw a picture to show how coal made the journey from the mines to the gasworks.



Draw a picture to show how the coal was made into gas.



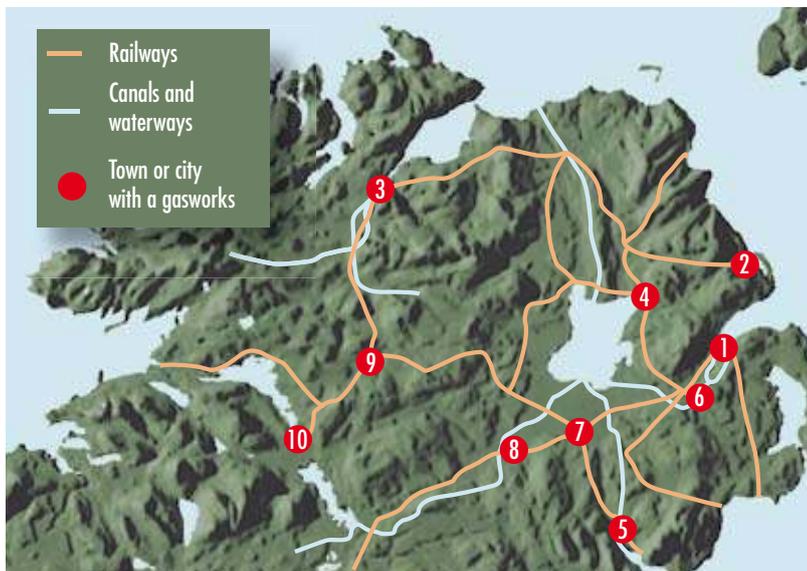
Draw a picture of gas being used in the home.

# 1.5 location of gasworks

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By 1899 there were 107 gas companies in Ireland. The map below shows where some of the gasworks were built in Northern Ireland. Use a map of Northern Ireland, from a library or the Internet, to help you to complete the names of the ten numbered towns or cities shown that had a gasworks.



1. B \_ \_ \_ \_ \_
2. L \_ \_ \_ \_
3. L \_ \_ \_ \_ \_ \_ \_ \_
4. A \_ \_ \_ \_
5. N \_ \_ \_ \_
6. L \_ \_ \_ \_
7. P \_ \_ \_ \_ \_ \_
8. A \_ \_ \_ \_
9. O \_ \_ \_ \_
10. E \_ \_ \_ \_ \_ \_ \_

**Q** Most of the coal used in the gasworks had to be transported from Britain. How did the coal used in the gasworks get to Carrickfergus?

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**Q** How did the coal get from the harbour to the gasworks?

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**Q** How could coal be transported to gasworks that were far away from the sea?

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**Q** Why was transporting coal by road for long distances not a good way of getting it to a gasworks?

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