

Energy Explorers – fossil fuels workshop 1

# National Curriculum links

**Key stage 2:**

**Science: Rocks:** describe in simple terms how fossils are formed when things that have lived are trapped within rock **Geography: Human Geography:** …the distribution of natural resources including energy

# Lesson Aim

To explore the link between fossil fuels and air pollution. Investigating what fossil fuels are, where they come from and their functions.

# Lesson objectives

Pupils will:

* Describe what fossil fuels are and how they are formed
* Identify and explain the different uses of fossil fuels and where you might find and use them, in everyday life
* Understand the link between fossil fuels and air pollutants.

# Key vocabulary

Air quality, air pollution, fossil fuel, oil, gas, coal, combustion, renewable, non-renewable, fossil fuel formation, extraction, energy, electricity

Resources required

* Energy explorers – fossil fuels – workshop 1 PowerPoint
* Pencils, pens, large sheets of paper (enough for two sheets per pair)

# Introduction

In this session pupils will discover what fossil fuels are, where they come from and what they can be used for. Pupils will use knowledge gained to explore where fossil fuels have been used to create or fuel every day objects found around the classroom and will make a poster or table to display these.

# Group / Class activity

| Timings | Activities | Notes / resources |
| --- | --- | --- |
| 5 minutes | **Slide 2:** **What is a fossil fuel?** Have you ever heard of a fossil fuel? Any idea what a fossil fuel might be? Where they come from?  **Fossil fuel definition:**  Fossil fuels are formed from the remains of plants and animals that died millions of years ago. These remains over time are turned into Coal, Oil and Gas… which contain lots of energy.  We use this energy to keep us warm at home and school, make our cars go and turn it into electricity and even plastic bottles and clothes.  Fossil fuels are: Coal, oil and gas | Supporting resources for teachers: <https://www.bbc.co.uk/bitesize/topics/zshp34j/articles/zntxgwx> |
| 5-10 minutes | **Slide 3: Energy Explorer Task 1: Do we need fossil fuels?**  **Activity:** Working in small groups or pairs.   1. Create a table on a sheet of paper with three columns. 2. Add a header title for each column, label them: Coal, Oil and Natural Gas 3. In each column work together to list as many uses for each of the fossil fuels listed.   **Examples:**  **Coal:** fires, power stations (electricity), steam trains, BBQ **Oil:** Petrol in cars and other vehicles, plastics, clothing **Natural Gas:** gas cooker/oven, heating, gas-powered vehicles | **Resources:**   * Enough sheets of paper for one per pair, or enough for small groups of up to four. * Pencils / pens / rulers |
| 1. minutes | **Slides 4-6: Where do fossil fuels come from?**  **Slide 4: Where do fossil fuels come from - brief overview**  **Ask: Does anyone know where fossil fuels come from?** Fossil fuels come from remains of animals, plants and organisms. Over millions of years animals, plants and organisms are buried under sediment and silt, heat (from the earth) and pressure (from the weight or sediments on top) cause them to change their form and become fossil fuel .  Once these fuels have been extracted from below the ground, processed and used, they cannot be used again. We describe them as ‘**non-renewable’**, as these resources will not be replenished across a human lifetime.  Ask the class if they know how  **Slide 5: Coal**  Describe how coal is formed over millions of years.  **Slide 6: Oil and Gas**  Describe how oil and gas are formed over millions of years.  **Ask:** What are the similarities and differences, between each process? | **Formation of coal:**  Refer to ‘What is coal and how does it form’ Factsheet can also play interactive coal formation game: <https://www.ncm.org.uk/learning/learning-resources/science>  Formation of fossil fuels (including Oil and Gas): Fossil Fuels 101 <https://www.youtube.com/watch?v=zaXBVYr9Ij0> |
| 15-30 minutes  **Optional activity** | **Slide 7: Energy Explorers Task 2: Story board**  (optional activity – depending on length of session – this could also be undertaken as a homework activity)  Children can work independently, in pairs or threes  **Activity:** Make a story board about the formation of either: coal, oil or gas.  **Tip**: For extra information, show the children Fossil Fuels 101 or ask them to do some independent research, using the internet. | **Further information for children / teachers:**  [Fossil Fuels 101](https://www.youtube.com/watch?v=zaXBVYr9Ij0), YouTube  **Resources:**   * Tablet/computer and Internet for independent research * Sheets of A4 or A3 paper * Pens, pencils, colouring pencils, felt tip pens, glue sticks * Craft paper, coloured paper, magazines / newspapers if children wish to create a collage poster |
| 5 minutes | **Slide 8: How do we get fossil fuels out of the ground?**  **Discussion:** Ask children if they can think of different ways to get fossil fuels out of the ground?  Answers include:  **Coal:** Mining (underground and open cast (surface mining)  **Oil and Gas:** Off-shore oil platform (rig) / on-land hydraulic fracking / pumping and drilling rig. | **Further information for teachers:**  [Fossil Fuels 101](https://www.youtube.com/watch?v=zaXBVYr9Ij0), YouTube  [Fun facts about fossil fuels for kids](https://sciencing.com/fun-fact-fossil-fuels-kids-10053769.html), SCIENCING website  [Fossil Fuel Facts](https://schools.leicester.gov.uk/media/5957/fossil-fuel-facts-accessible.pdf), PDF, School’s Extranet, LCC |
| 10 – 15 minutes | **Slide 10-12: Why do we need fossil fuels?**  **Slide 10: Fossil Fuels Video Discussion:** Ask children why they think they think we need fossil fuels? Write down their ideas on the board.  **Show**: [Fossil Fuels video](https://bpes.bp.com/fossil-fuels-resources), BP Educational Services (1:05)  **Slide 11: What does coal make?** **Discussion:** Ask children what do we use coal for? Can they name anything we use at home that coal might be used as an ingredient?  **Slide 12: What are oil and gas used for? Discussion:** Ask children if they can remember where oil and gas where used during the Fossil Fuel Video? Remind them that the stored energy in oil and gas can be burnt to create heat. | **Resources:**  [Fossil Fuels Video](https://bpes.bp.com/fossil-fuels-resources), BP Educational Services  **Please note** you will need to sign up to view this video. Once signed in all resources are free to access or download. |
| 10 minutes | **Slide 13: Energy Explorer Task 3: Classroom exploration**  **Activity:** In pairs, take a tour of the classroom and continue the table of objects and items from **task 1**, that use fossil fuels for energy, or to make them. | **Resources:**   * Table of objects that are made from, or use fossil fuels * Pens/ pencils |
| 5 minutes | **Slides 14-15: Do fossil fuels make air pollution?**  **Discussion:** In pairs, ask the children to discuss if they think fossil fuels make air pollution or not. After a minute or two, ask them to raise their hands if they agree air pollution can be made from fossil fuels, then ask again, if anyone disagrees.  Explain to the children that air pollution can be made from fossil fuels.  **How do fossil fuels contribute to air pollution?**  Burning fossil fuels to make vehicles go, using gas for cooking, burning coal in fireplaces to keep our houses warm and burning coal in power stations to create electricity  The process of mining also creates large amounts of dust and the transportation of fossil fuels, once extracted, will also cause air pollution. |  |
| 3 minutes | **Plenary**  Summarise the lesson and key learning points with the children.  Can the children remember:   * The name of each fossil fuel? * Where fossil fuels come from? * Some things that use each fossil fuel? |  |

# Extensions

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| --- | --- |
| Activities | Notes / resources |
| **Homework or extension activity suggestions:**   1. Complete Task 2 ‘**making a story board**’ to show how either coal, oil or gas are formed (if not undertaken during lesson) 2. Complete the **‘Fossil fuels’ worksheets** (differentiated easier and more difficult versions available) from the [BP Educational Service website](https://bpes.bp.com/fossil-fuels-resources). 3. **Make a poster displaying the uses of coal, oil or natural gas** – children can choose one fuel to theme your poster around or make a poster that includes all fossil fuels. Children can work in pairs or alone. | **Resources:**  Storyboard/ fossil fuel uses poster:   * Sheets of A4 or A3 paper * Pens, pencils, colouring pencils, felt tip pens, glue sticks * Craft paper, coloured paper, magazines / newspapers if children wish to create a collage poster   **Fossil fuels worksheets**: [Fossil fuel resources, BP Education al Services website](https://bpes.bp.com/fossil-fuels-resources)  Please note to use this website you will need to sign up, however, resources are free. |