

## Key Stage 2 (Year 5) SCIENCE

### Lesson 4: "Everyday activities and outdoor air pollutants"

Length of Lesson: 40 minutes

National Curriculum in England, for teaching from September 2015

Curriculum Topic: Properties and changes of materials

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/425601/PRIMARY\\_national\\_curriculum.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/425601/PRIMARY_national_curriculum.pdf) pages: 170-173

#### CURRICULUM

*Properties and changes of materials (Year 5)*

Statutory requirements:

Understand how gases may be separated:  
filtering.

Give reasons for the particular uses of  
everyday materials: metals, wood and plastic.

#### CURRICULUM

Non-statutory:

#### LESSON PLAN

In this lesson the teacher will use the resources provided to explain to the class the gases in the atmosphere, and that the gases made from natural processes differs from the gasses that are manmade. Ask the class which materials are not natural and which ones are.

Answers should include: Natural - wood, oil, coal, some metals. Manmade: plastic, aluminum foil, glass.

Students will be given a picture of 'Sources of air pollution' caused by everyday activities, to help understand what causes manmade pollutants to be in the air from everyday use: burning wood for fire, heat and cooking food, burning plastic from rubbish, fumes to travel around. Students do not need to know the names of many pollutants, but a basic knowledge of carbon dioxide and it's over-abundance on the planet as a result of human combustion is encouraged. The teacher resource information is divided into three parts.

Briefly discuss the Great London Smog from 1952, the material of which is required. Next, ask the class whether they think air quality in London, as well as other cities if applicable, is better or worse today. Inform the class that technology has improved and there are now filter systems which trap some pollutants, but that there are now smaller pollutants formed as a result of burning everyday materials which you can hardly see and cannot be filtered, unlike the big black haze over London in 1952.

Ask the class whether they have been noticing or are aware of the climate becoming more different, such as changes in global temperature, warming of the sea, decrease of ice on the north and south pole, warmer winters, higher summer temperature. They can answer yes or no.

Class Homework: Ask the class to make a list of all the plastic things they have in their kitchen. Ask them to bring it to the next class, and write the most common plastics on the board.

## OBJECTIVES

- Students learn about the natural atmospheric composition and the impact that burning everyday materials can cause an increase in air pollution.
- Understand where various pollutants come from and their impact: acid rain,
- Students consider the changing nature of air pollution from industrial sources (The Great London Smog) to traffic and other sources.

## LESSON REQUIREMENTS:

- Reading piece about the London Smog of 1952 for each pupil/group
- Picture
- Whiteboard
- 4 sets of images for each pupil/group

## Sources of outdoor air pollutants

### Reading Task

## The Great London Smog of 1952

### **What happened in London on the 5th of December, 1952?**

A fog so thick and polluted it left thousands dead wreaked havoc on London in 1952. The smoke-like pollution was so toxic it was even reported to have choked cows to death in the fields. It was so thick it brought road, air and rail transport to a virtual standstill. This was certainly an event to remember, but not the first smog of its kind to hit the capital.

During the day on 5th December, the fog was not especially dense and generally possessed a dry, smoky character. When nightfall came, however, the fog thickened. Visibility dropped to a few metres. The following day, the sun was too low in the sky to burn the fog away. That night and on the Sunday and Monday nights, the fog again thickened. In many parts of London, it was impossible at night for pedestrians to find their way, even in familiar districts. In The Isle of Dogs area, the fog there was so thick people could not see their feet.

### **What is SMOG?**

SMOG is a type of large-scale outdoor pollution. It is caused by chemical reactions between pollutants derived from different sources, primarily automobile exhaust and industrial emissions. Cities are often centres of these types of activities, and many suffer from the effects of smog, especially during the warm months of the year. SMOG can easily be remembered as the combination of SMOke and fOG.

Impacts of the smog:

Officials believe that as many as 12,000 people may have died. Many of those killed were elderly people or those who were already weak or already suffered from chronic respiratory or cardiovascular complaints.

- Many people suffered from breathing problems
- Travel was disrupted for days

## Teacher Information

### **Part 1. Air Quality – A Global Problem**

Students will learn that air pollution has been around for a long time, as a result of natural influences (volcanoes and natural forest fires) but that since the industrial revolution the amount of fumes emitted into the atmosphere has increased substantially.

Students will learn that there has been a changing nature of air pollution from industrial sources to traffic and other sources.

### **Part 2. Gases in the atmosphere.**

- Students are taught that before there were humans, the Earth's atmosphere was most likely formed by volcanic activity and consisted mainly of carbon dioxide and water vapour. This produced a natural atmospheric balance.
- Students are taught about how human activity has changed the composition of the atmosphere by adding small pollutants as a result of daily activities. These activities include:
  - burning waste such as plastic,
  - burning excess wood,
  - creating materials such as glass and plastic,
  - burning oil for transportation,
  - burning coal to heat the homes and produce electricity.

### **Part 3. What is emitted from the burning of everyday materials?**

#### **Wood**

Wood is a very popular material to burn as it gives heat and is used mostly for cooking and heating the home. A lot of burning takes place inside the home, leaving air pollutants with no place to go.

Carbon dioxide is the most common gas produced by burning wood. Wood is mostly made up of carbon, which during burning turns into the carbon dioxide gas.

#### **Plastic**

home burning of waste is an activity that takes place daily all over the world. Air emissions from home burning are released directly into the house or outside.

\* Please note, students are expected to complete a homework task where they make a list of the plastic in their kitchen. They should look at packaging: in the shelves, fridge and cupboards.

#### **Oil for travel: cars, airplanes, boats, buses**

The pollutants emitted from transportation makes up a large proportion of the global atmospheric change and can alter the natural amount of gases in the air.

