

Learning about



AIR QUALITY

PRIMARY TEACHERS GUIDE

A guide to using the site within CfE

www.LearnAboutAir.com

Air Quality Learning Package

Teacher's Notes

Welcome to this interactive learning module on air quality. The module will help your pupils learn more about the air that we breathe and its importance in our lives. The air that we breathe is something that we all take for granted as we can't see it. However air is very important to us, poor air quality can makes us feel unwell so we should take care of it.

By working their way through this module the pupils will find out:

- what the air used to be like compared to how it is now
- the main pollutants affecting air quality
- how we measure the quality of the air
- how it compares to other parts of Scotland and the world
- the impacts of poor air quality
- what we can do to ensure we have, and continue to have good quality air.

It is aimed at pupils in primary 5-7 and intends not only to teach them about air quality and the impact it can have on their lives and how they can influence it, but it also aims to ensure this message is fed back into the pupil's home environment, thus reaching the wider population of Scotland. This module fulfils the People, place and the environment section of the social studies element of the Curriculum for Excellence for second level pupils. It also links with a number of Experiences and Outcomes from other curricular areas. This information is included for your reference. The package can also be used to demonstrate compliance with the requirements of the eco-schools award scheme, in particular the transport aspect as pupils can identify ways to improve air quality through car sharing, cycling and Walk to School weeks. The aim of the package is to not only achieve a greater awareness of local air quality and how it affects us, but also to highlight how our actions in our daily lives can have an impact on the air that we breathe.

Feedback

If you wish to provide us with any feedback about the site or these notes, please do so at this page on the site: [Feedback](#)

How to use the Learning Package

There are five main parts to the learning module in the Primary section of the site. It is designed to allow the pupils to work through each section in sequence:

- History
- Major Pollutants
- Monitoring and Measurements
- UK v Rest of the World
- Impact

The pupils can view videos and read related text before completing the relevant activities for each section. The videos may be watched as a whole class (on a Smartboard) with the opportunity to read the text and complete the activities either individually, in pairs or small groups. Some activities will be completed on line, others are paper based. These are included within your pack for you to print.

Learning about AIR QUALITY

Start | Primary Sections: [History](#) | [Pollutants](#) | [Monitoring & Measurements](#) | [Around the World](#) | [Solutions](#)

Primary Home

This educational package is aimed at the primary 5-7 age group and intends not only to teach pupils about air quality and the impact it can have on their lives and how they can influence it, but also aims to ensure this message is fed back into the pupil's home environment, thus reaching the wider population. The module fulfils the people, places and the environment section of the social studies element of the Curriculum for Excellence for second level pupils. It can also be used to demonstrate compliance with the requirements of the eco-schools award scheme. The aim of the package is to not only achieve a greater awareness of local air quality and how it affects us, but also to highlight how our actions in our daily lives can have an impact on the air that we breathe.

Monitoring the air quality around your school alongside other fieldwork forms a key part of the package. Details on how to request the free loan of an air sensor from SEPA can be found below. Please note that the sensor should be setup a week before the Monitoring & Measurements lesson to provide enough data for the pupils to assess.

[Request an Air Sensor for your School](#)

Sections:

1. **History** - This section allows the pupils find out what air pollution was like in the past and what measures have been put in place to overcome this. The pupils have the opportunity to complete an activity related to the history of air pollution.
 - [Activity 1](#)
 - [Activity 2](#)
2. **Major Pollutants** - This section focuses on what the major pollutants are, a description of each pollutant is also included. The information given will help the pupils to complete activities relating to the major pollutants.
 - [Activity 1](#)
 - [Activity 2](#)
3. **Monitoring & Measurements** - This aspect of the website allows the pupils to visit the Scottish Air Quality website. They will be able to explore where local authorities have air quality monitoring sites and be able to look at the data the councils have collected over the years. This section also allows pupils to actually gather air quality data around their school environment.
 - [Activity 1](#)
 - [Activity 2](#)
 - [Activity 3](#)
4. **Air Quality Around the World** - The pupils can explore how the air quality in Scotland and the UK compares with other cities in the world. The follow up activity allows the pupils to examine other countries air quality.
 - [Activity 1](#)
5. **Solutions** - The focus of this section is for the pupils to now consider what they can do to improve the air quality in their area and how to broadcast this message to the wider community.

A [Guide for Teachers](#) and external links can be found in the [Resources](#) page (A link is at the bottom of every page). Also there are [Homework/Extension Sheets](#) for each of the topics covered in this section of the website. Links to these

Guide to the Sections

Introduction

This short video and text explains to your class why this Air Quality Learning Module has been created and shares the aims of the overall site. To enter the Primary section of the site, choose the 'Primary' button under the video.

Primary Module Home

This section is an introduction to the Primary materials and a guide to the sections, lessons and materials contained in this module.

History

The pupils can find out what air pollution was like in the past and what measures have been put in place to overcome this. The pupils have the opportunity to complete a drag and drop activity related to the history of air pollution.

The second activity allows the pupils to explore the ways in which fuels and energy sources have changed and developed over the years. The pupils can research these, listing the advantages, disadvantages and general information for the various sources.

Major Pollutants

The text and video focus on what the major pollutants are, a description of each pollutant is also included. The information given will help the pupils to complete the 'What am I?' game.

After exploring the three main pollutants: Carbon Monoxide, Nitrogen Dioxide and Particulate Matter, the pupils can then explore other pollutants that affect the quality of our air we breathe.

Possible pollutants to consider are:

- Sulphur Dioxide
- Ozone (which is formed in the air by other pollutants)
- Methane (although this is not 'measured', it still has an affect on the environment)

Monitoring and Measurement

The main activity within this section of the website is the use of the sensors. The children will be able to use this data analysis tool to gather information about the quality of the air around their local environment.

Traffic and travel surveys have been included for your use. It would be beneficial for the pupils to conduct more than one traffic survey in order to compare and contrast the traffic in their local area on various days and at various times, this information can be used in conjunction with the data collected from the sensors. Times could be specified and it could be carried out x amount of times over a week/ month/ term. If willing, perhaps a small group of children could meet the teacher at 8.45 am to record the number of cars around the school. This could also be repeated at other set times (e.g. 11 am, 1:45 pm) and the end of the school day (2:40-2:45 pm). The pupils can then explore why some times are busier than others. The pupils may also note and investigate the number of cars idling at 2:45pm near the school. If this is an issue at your school, it may be possible for a Vehicle Idling Patrol visit. For further details, please contact your Local Environmental Health Department.

The pupils also have the opportunity to interview certain people about their thoughts and perspectives relating to the traffic in their local area, e.g. crossing patrol, parents and fellow pupils. To encourage people to walk more and use the car less the pupils may write a persuasive piece outlining information they have gathered.

A guide to accessing the Sensor Data

Please click the link on the Activity Page (View and Assess your School's Results) to access the data analysis tool and follow the instructions below.

Please note that results will be uploaded at midnight every night once the data being collected by the sensor and this information being uploaded. Essentially you can see all data from previous day and before.

From the data selector you may select an urban or rural example, your own school or another school participating in the Air Quality Learning Module. Once you have selected your school you may then find your class, followed by the pollutant. The two main pollutants that can be selected are Particulate Matter and Nitrogen Dioxide.

Data selector

Selected school:
Urban example ▼

Selected class:
None ▼

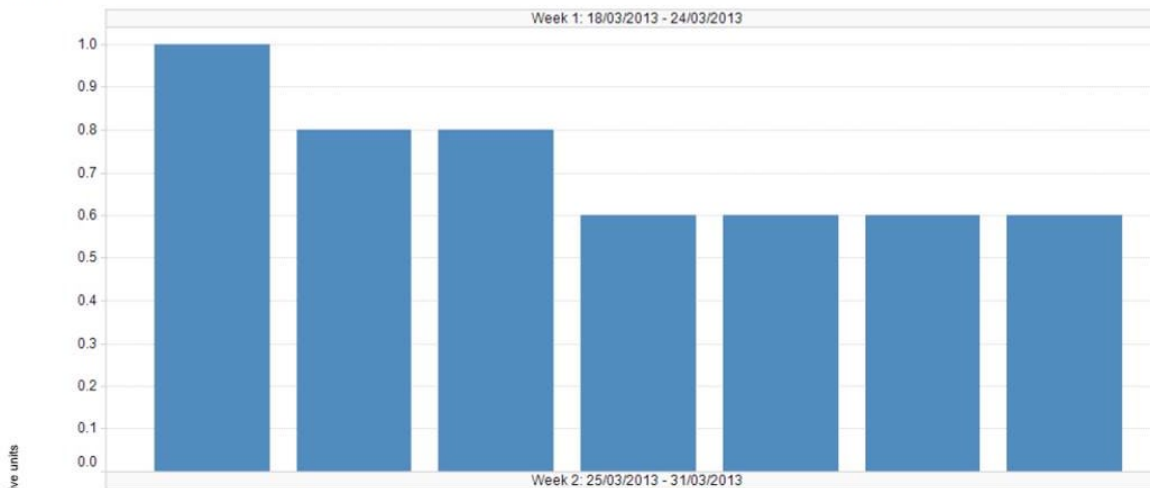
Pollutant:
PM ▼

Once the information has been selected in the above drop down menus, the pupils can then see the results in the form of a bar graph. At the end of the two week sensor period, there will be daily averages for each day of week one and week two. It is advisable to note that the data collected is in relative units to show patterns and not actual units. Pupils can consider why the air quality varies through the week.

Further to the data being shown daily, this information can then be broken down into hourly

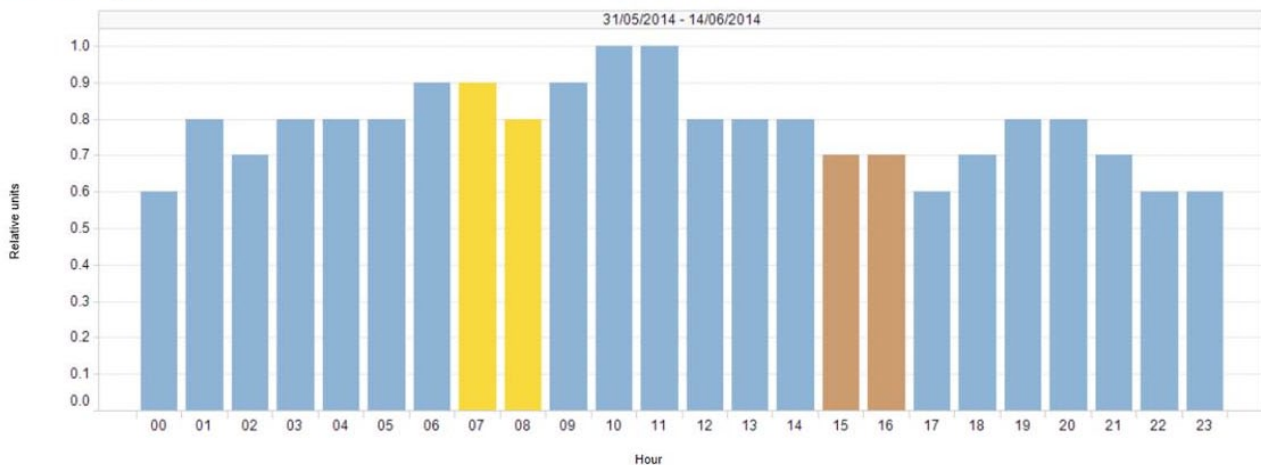
timeslots averages, in order to allow the pupils to discuss when the air quality pollutants are higher or lower. The tool will always highlight 07:00-09:00 and 15:00 to 17:00 as these are typical drop-off and pick up periods.

PM daily averages



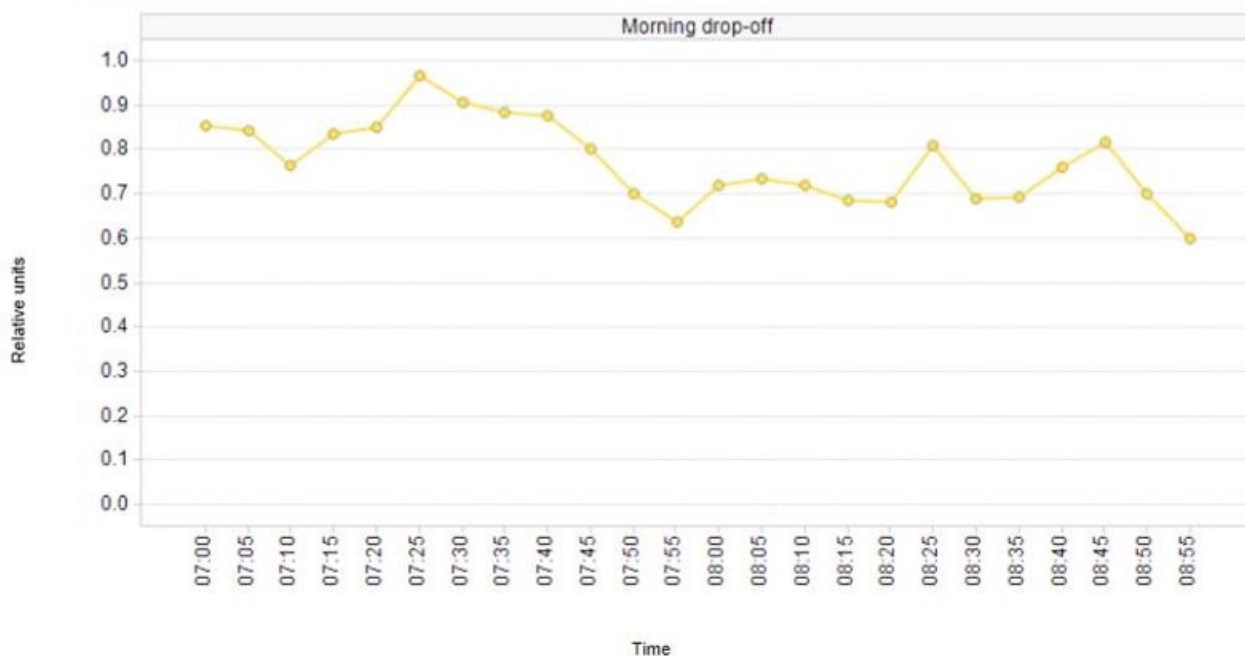
Once the pupils have completed their Traffic Survey (see sheet in pack) then it may be worth making a link between the data collected on a particular day/ time by the pupils and by the sensor.

PM hourly averages (Mon-Fri)



In addition, both the morning drop-off and pick-up time information have been broken down into five minute averages. Again, this allows the pupils to discuss and draw conclusions about when the pollutants are at their highest and lowest at these times.

PM five minute averages (Mon-Fri)



Further Activities

The pupils could also visit the Scottish Air Quality website (www.scottishairquality.co.uk). They will be able to explore where Local Authorities have air quality monitoring sites and be able to look at the data councils has collected over the years. A guide to accessing this website is included. Teachers may wish to display this on the smartboard to support the pupils as they access this site.

The activity linked to this site, is asking the pupils to look at the information that has been collected and plot this information on a graph. In particular, the pupils should focus on the PM10 level which had been recorded for that area. To help the pupils understand more about PM10, class teachers may wish to use the following:

PM10 is a general name for tiny particles that are less than ten microns in diameter. This is roughly a seventh of the width of a human hair, so they can only be seen under a microscope and not with the naked eye. The particles themselves can be from a variety of sources and because they are so small they can be inhaled deep into the lungs.

The pupil activity sheet is included within this pack (page 11). You may wish to explore air quality in your local authority by asking the pupils to select a monitoring site from the Scottish Air Quality website and allowing them to record their findings. A blank pupil sheet has been included for this (page 12).

Air Quality Around the World

The pupils can explore how the air quality in Scotland and the UK compares with other cities in the world through the text and video. The follow up activity allows the pupils to plot particular countries with low, medium or high PM10 levels which has been previously gathered from the World Health Organisation website (http://www.who.int/phe/health_topics/outdoorair/databases/en/).

The pupils require an atlas, the UK v Rest of the World information sheet and the blank map in order to complete this task (it may be advisable to increase the size of the map to A3). The pupils may complete this activity individually by finding and plotting all the cities or they may work in pairs / small groups. Each pair or group could be asked to locate one or more cities then share their findings with the rest of the class to create a whole class map.

As a follow up activity, the pupils can select one city from the list and research this in more detail. The pupils can explore the causes of air pollution, the effect the air quality has on people and the environment and also what measures have been put in place to improve the air quality, if any.

Solutions

Road traffic is the biggest source of our air pollution. The pupils should now consider what they can do to improve the air quality in their area and how to broadcast this message to the wider community. This may include:

- Researching the Local Authority's Air Quality Action Plan (Why does a local authority have one? If not, why not? What information, pledges and measures are contained within this plan?)
- Devising a School Travel Plan
- Walk to School Weeks
- Encouraging car sharing/ park and stride
- Creating posters/ leaflets for pupils and parents
- Informative assemblies for pupils, parents and the wider community.

After completing the various elements of this learning package, the pupils could create a mini (Air Quality) Action Plan for their school/ local area in line with their Local Authority's Air Quality Action Plan and their school's Travel Plan. This information could be placed on the school's website and information could be shared at a whole school assembly.

Traffic Survey

Name: _____ Class: _____

Location: _____

Start Time: _____

Place a tally mark (|) in the box for each vehicle you see.

Cars	Vans	Lorries	Buses

Finish Time: _____

Draw a bar chart in the space below, showing your results.



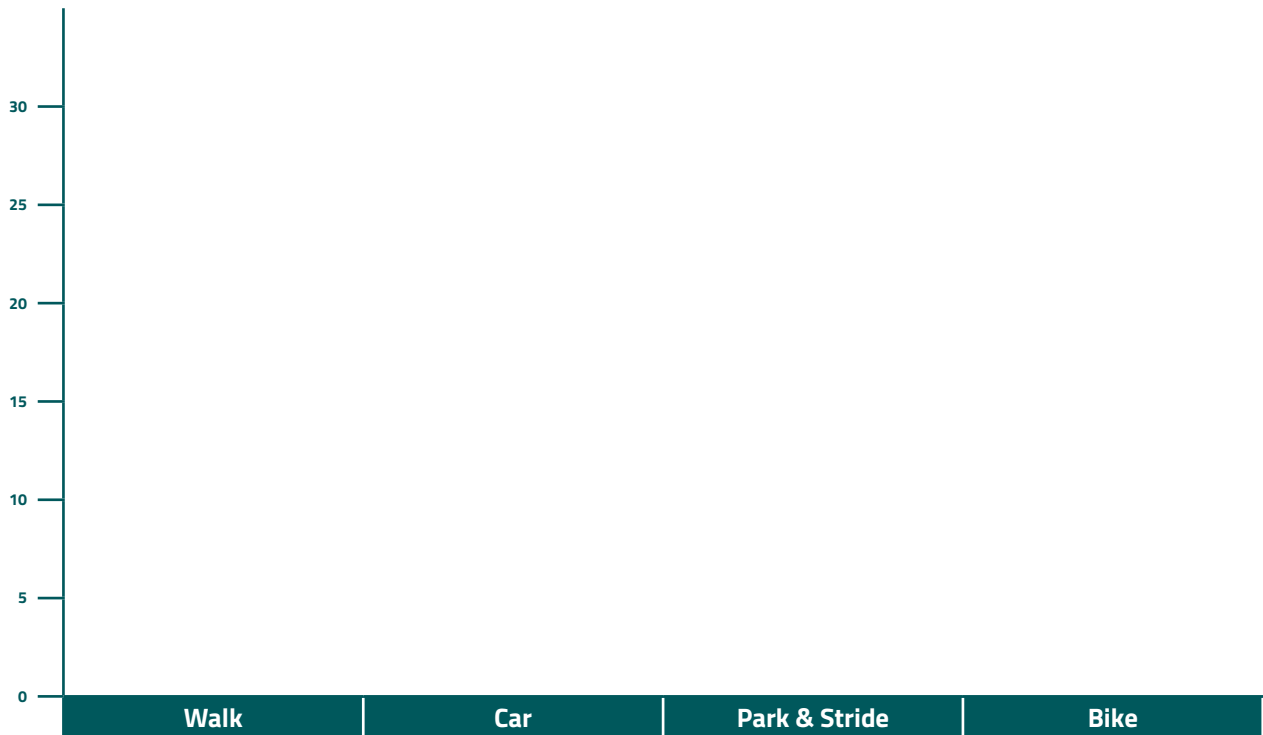
Travel Survey

Name: _____ Class: _____

Find out how your classmates travel to school. Place a tally mark (|) in the correct box .

Walk	Car	Park & Stride	Bike

Draw a bar chart in the space below, showing your results.



Air Quality Around the World Info Sheet

Name: _____ Date: _____

The World Health Organisation have carried out studies to find information about the air quality in different cities. Use an Atlas to help you plot the following cities.

Plot these cities in green. They have a low PM10 Level.

Winnipeg (Canada) Tuscon (USA), London (England)
Canberra (Australia) Edinburgh (Scotland)

These cities have a medium PM10 level. Plot these cities in orange.

Jaipur (India) Beijing (China) Lagos (Africa)
Cairo (Egypt) Kuwait City (Kuwait)

These cities should be plotted in red. They have a high PM10 level.

Delhi (India) Karachi (Pakistan) Gaborone (Botswana)
Ulaanbaatar (Mongolia) Quetta (Pakistan)

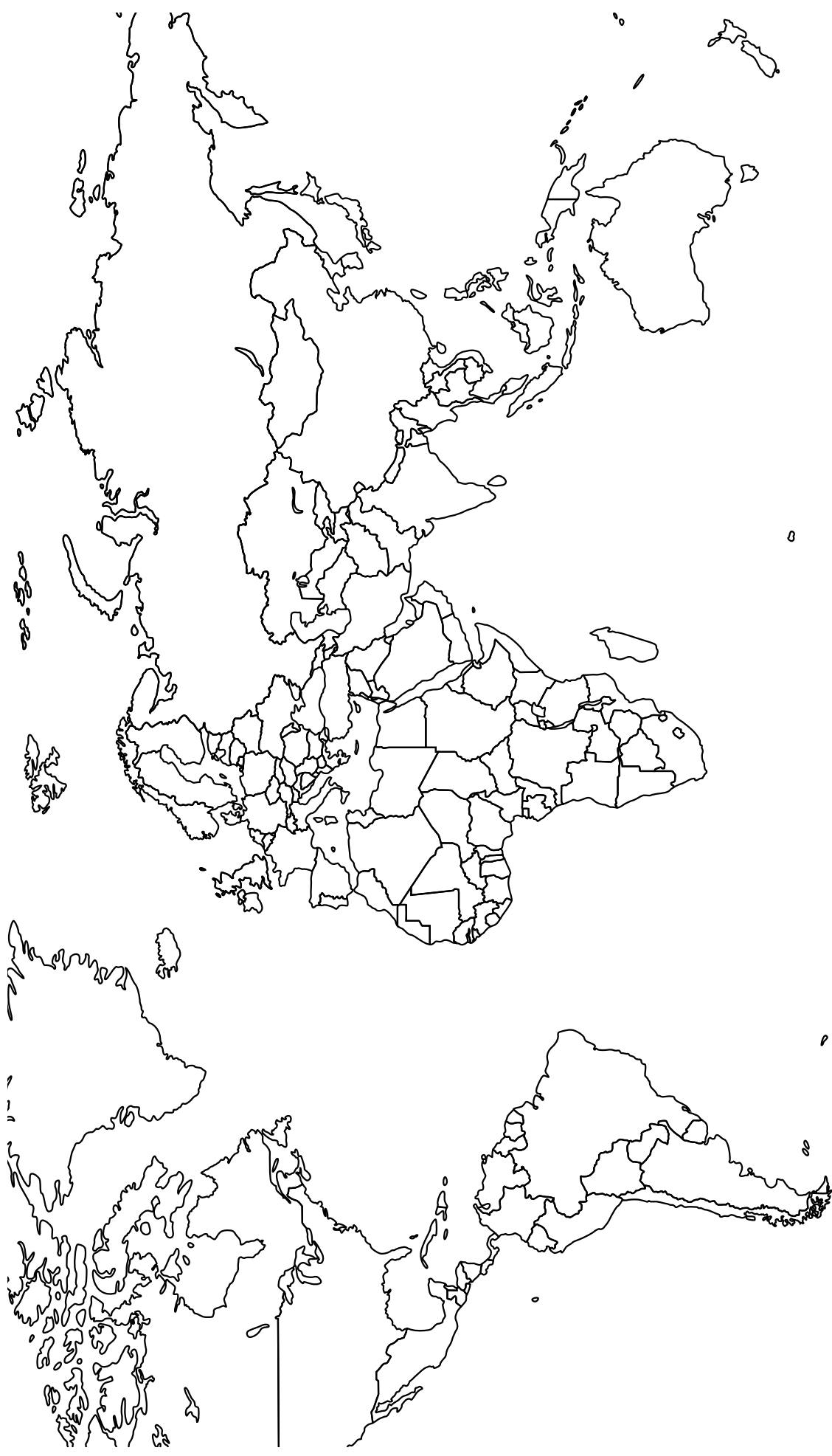
Does anything surprise you?

Can you think of reasons why the air quality is poorer in particular cities?

Air Quality Around the World Map

Name: _____

Date: _____



Air Quality Learning Package

Relevant Second Level Experiences and Outcomes

Health and Wellbeing

Mental, emotional, social and physical wellbeing	Experiences and Outcomes	Pupil Activities
Social wellbeing	<ul style="list-style-type: none"> I make full use of and value the opportunities I am given to improve and manage my learning and, in turn, I can help to encourage learning and confidence in others. HWB 2-11a I value the opportunities I am given to make friends and be part of a group in a range of situations. HWB 2-14a 	Working cooperatively with peers.

Air Quality Learning Package

Relevant Second Level Experiences and Outcomes

Literacy and English

Listening and Talking	Experiences and Outcomes	Pupil Activities
<p>Tools for listening and talking</p> <p>Finding and using information</p>	<ul style="list-style-type: none"> I value the opportunities I am given to make friends and be part of a group in a range of situations. When I engage with others, I can respond in ways appropriate to my role, show that I value others' contributions and use these to build on thinking. LIT 2-02a As I listen or watch, I can identify and discuss the purpose, main ideas and supporting detail contained within the text, and use this information for different purposes. LIT 2-04a 	<p>Sharing thoughts and building upon ideas through group discussion. Developing the listening and talking skills.</p> <p>Find and use the information from the website.</p>
Reading	Experiences and Outcomes	Pupil Activities
<p>Finding and using information</p> <p>Understanding, analysing and evaluating</p>	<ul style="list-style-type: none"> Using what I know about the features of different types of texts, I can find, select and sort information from a variety of sources and use this for different purposes. LIT 2-14a To show my understanding across different areas of learning, I can identify and consider the purpose and main ideas of a text and use supporting detail. LIT 2-16a 	<p>Find and use information from the website and other appropriate sources, showing understanding of the purpose and main ideas of the content.</p>

Air Quality Learning Package

Relevant Second Level Experiences and Outcomes

Literacy and English

Writing	Experiences and Outcomes	Pupil Activities
<p>Enjoyment and choice</p> <p>Tools for writing</p>	<ul style="list-style-type: none"> ▪ I enjoy creating texts of my choice and I regularly select the subject, purpose, format and resources to suit the needs of my audience. LIT 2-20a ▪ I can spell most of the words I need to communicate, using spelling rules, specialist vocabulary, self-correction techniques and a range of resources. LIT 2-21a ▪ In both short and extended texts, I can use appropriate punctuation, vary my sentence structures and divide my work into paragraphs in a way that makes sense to my reader. LIT 2-22a ▪ Throughout the writing process, I can check that my writing makes sense and meets its purpose. LIT 2-23a ▪ I consider the impact that layout and presentation will have and can combine lettering, graphics and other features to engage my reader. LIT 2-24a 	<p>To create a piece of writing which illustrates the importance of clean air.</p>

Air Quality Learning Package

Relevant Second Level Experiences and Outcomes

Literacy and English

Writing	Experiences and Outcomes	Pupil Activities
<p>Organising and using information</p> <p>Creating texts</p>	<ul style="list-style-type: none"> ▪ I can use my notes and other types of writing to help me understand information and ideas, explore problems, make decisions, generate and develop ideas or create new text. LIT 2-25a ▪ By considering the type of text I am creating, I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience. LIT 2-26a ▪ I am learning to use language and style in a way which engages and/ or influences my reader. ENG 2-27a ▪ I can convey information, describe events, explain processes or combine ideas in different ways. LIT 2-28 	<p>To create a piece of writing which illustrates the importance of clean air.</p>

Air Quality Learning Package

Relevant Second Level Experiences and Outcomes

Numeracy and Mathematics

Information handling	Experiences and Outcomes	Pupil Activities
<p>Data and analysis</p>	<ul style="list-style-type: none"> ▪ Having discussed the variety of ways and range of media used to present data, I can interpret and draw conclusions from the information displayed, recognising that the presentation may be misleading. <p style="text-align: right;">MNU 2-20a</p> ▪ I have carried out investigations and surveys, devising and using a variety of methods to gather information and have worked with others to collate, organise and communicate the results in an appropriate way. <p style="text-align: right;">MNU 2-20b</p> ▪ I can display data in a clear way using a suitable scale, by choosing appropriately from an extended range of tables, charts, diagrams and graphs, making effective use of technology. <p style="text-align: right;">MTH 2-21a</p> 	<p>Investigate the levels of air pollution in North Lanarkshire by visiting www.scottishairquality.co.uk</p> <p>Record and present this information in an appropriate way and draw conclusions from this information.</p>

Air Quality Learning Package

Relevant Second Level Experiences and Outcomes

Sciences

Biological systems	Experiences and Outcomes	Pupil Activities
<p>Body systems and cells</p>	<ul style="list-style-type: none"> By investigating some body systems and potential problems which they may develop, I can make informed decisions to help me to maintain my health and wellbeing. SCN 2-12a 	<p>Identify, name and describe the simple structure and functions of the major parts of the body as they relate to the process of breathing.</p> <p>Recognise the function of the lungs and how lung capacity can be affected by asthma.</p>
Materials	Experiences and Outcomes	Pupil Activities
<p>Properties and uses of substances</p>	<ul style="list-style-type: none"> By contributing to investigations into familiar changes in substances to produce other substances, I can describe how their characteristics have changed. SCN 2-15a 	<p>Introduction to CO, NO₂ and PM₁₀.</p>

Air Quality Learning Package

Relevant Second Level Experiences and Outcomes

Social Studies

People, past events and societies	Experiences and Outcomes	Pupil Activities
<p>People, past events and societies</p>	<ul style="list-style-type: none"> ▪ I can use primary and secondary sources selectively to research events in the past. <p style="text-align: center;">SOC 2-01a</p> <ul style="list-style-type: none"> ▪ I can discuss why people and events from a particular time in the past were important, placing them within a historical sequence. <p style="text-align: center;">SOC 2-06a</p>	<p>Use appropriate sources to research the past events e.g. the London smog.</p> <p>Discuss the London smog and the impact it had and what was put in place to improve the quality of air. Complete timeline activity.</p>

Air Quality Learning Package

Relevant Second Level Experiences and Outcomes

Social Studies

People, past events and societies	Experiences and Outcomes	Pupil Activities
<p>People, past events and societies</p>	<ul style="list-style-type: none"> ▪ I can describe the physical processes of a natural disaster and discuss its impact on people and the landscape. SOC 2-07a ▪ I can discuss the environmental impact of human activity and suggest ways in which we can live in a more environmentally- responsible way. SOC 2-08a ▪ Having explores the ways journeys can be made, I can consider the advantages and disadvantages of different forms of transport, discussing their impact on the environment. SOC 2-09a ▪ To extend my mental map and sense of place, I can interpret information from different types of maps and am beginning to locate key features within Scotland, UK, Europe or the wider world. SOC 2-14a 	<p>Explore and discuss how natural disasters can have an impact on people and landscapes.</p> <p>Explore ways to improve the quality of the air in North Lanarkshire e.g. walking more, using the car less, car sharing.</p> <p>Use an atlas to locate major cities and plot these on a map using particular colours to highlight the level of air pollution.</p>

Air Quality Learning Package

Relevant Second Level Experiences and Outcomes

Technologies

Technological developments in society	Experiences and Outcomes	Pupil Activities
<p>Technological developments in society</p>	<ul style="list-style-type: none"> Having analysed how lifestyle can impact on the environment and Earth's resources, I can make suggestions about how to live in a more sustainable way. <p>TCH 2-02a</p>	<p>Explore how our lifestyles impact on the environment.</p>
ICT to enhance learning	Experiences and Outcomes	Pupil Activities
<p>ICT to enhance learning</p>	<ul style="list-style-type: none"> Throughout all my learning, I can use search facilities of electronic sources to access and retrieve information, recognising the importance this has in my place of learning, at home and in the workplace. I explore and experiment with the features and functions of computer technology and I can use what I learn to support and enhance my learning in different contexts. <p>TCH 2-03a</p> <p>TCH 2-04a</p>	<p>Use the NLC Air Quality website and other relevant websites to locate information, use this information and understand the importance of it in their everyday life.</p>