Leeds
Primary School

Clean Air Toolkit Key Stage 1

Leeds CITY COUNCIL

Clean Air Leeds

LSx London Sustainability Exchange

Influencing Travel Behaviour

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SUSTAINABLE TRAVEL AND THE BENEFITS TO AIR QUALITY

This toolkit has been designed by Leeds City Council in partnership with London Sustainability Exchange to help you promote sustainable travel to school by teaching your KS1 pupils about air quality. The toolkit supports your school travel plan, contributes to Modeshift STARS and Healthy Schools Initiative and helps the city reduce its emissions in light of the climate emergency.

We will help you and your pupils find out the answers to the following questions:

- What is air quality?
- How does it affect us?
- How do we measure it?
- Can we make a difference?

We have divided up this toolkit into four sections: explore, experiment, create and take action. All of our sections go together as a full unit of work but we have left room for you to be flexible if you just have time for a lesson or two.

Part 1: Explore

In part one of the toolkit, your pupils start by learning about and beginning to understand the key sources of air pollution at school, what we can do to protect people from it and how we can keep our air clean. They will use a simple powerpoint to help them think about why clean air is important and what stops the air from being clean.

Part 2: Experiment

In this part of the toolkit, your pupils will build on their learning from part one, moving from understanding what air quality is to finding out how to measure it. They will use the sources of pollution information sheet to discuss the different types of pollution they might see around school and use the data collection sheet to survey one area of the school. They can also use the lichen observation activity to better understand the impact of air pollution on nature.

Part 3: Create

In part three of the toolkit, your pupils will design their own Clean Air Superhero, thinking about what their superhero could do to help your school, city, country or even the whole world.

Part 4: Take action

In the final part of the toolkit, your class will think about communication, campaigning and encouraging behaviour change in their own lives, in the school and in their community. Your class will use this learning to think about how to communicate the importance of good air quality. They will create posters to promote clean air and reducing air pollution, and could even link these to Clean Air Day, or your own school led Clean Air week.

LINKS TO LEARNING:

This toolkit has been designed to deliver key learning objectives and curricular aims for Science and Geography at KS1.

Additionally, this toolkit is ideal for use if your school is signed up to Modeshift STARS or Healthy Schools Initiative.

BEFORE YOU START:

Assembly notes

Before teaching your class using the lesson plan in part one, you could give a school assembly on air quality and links to idling vehicles (see Appendix 1).

In the assembly, you should tell your pupils that pollution from traffic outside the school grounds, including idling vehicles, could be making the air in their classrooms and playgrounds dangerous to breathe.

Do any of your pupils have asthma? A study has found that up to 30% worldwide of all new asthma cases in children are caused by exposure to air pollution.
Do any of your pupils play sports? Studies have found that pollutants from traffic reduces significantly reduces children's lung function - and we need our lungs for running, jumping and being healthy both now and in the future.

Use the "Hands Up" travel survey (Appendix 2) to get information about how your pupils and staff travel to and from school. Alternatively, you can complete the "hands up" travel survey with each class separately as part of registration or by sending children to survey each class.

Surveys

If you are not having the children complete this task ask teachers to conduct a HANDS UP PUPIL and STAFF SURVEY - see Appendix 2 for surveys.

Please note – the structure of lessons in this Toolkit is a suggestion and can be adapted to suit the needs of your school / children as required.

PART 1 – EXPLORE

In this part of the toolkit, your pupils start by learning about poor air quality.

Next, they will use the discussion questions:

Why is clean air important?
What stops our air being clean?

Your pupils will then learn about different types of pollutants, what causes them and what they do to human and environmental health.

Finally, your class will think about what they now know about poor air quality and how they can protect themselves from it.

Curriculum links

- Geographical Skills and Fieldwork: Use simple fieldwork and observational skills to study the geography of the school and its grounds, and the key human and physical features of its surrounding environment.
- Working Scientifically: Gathering and recording data to help in answering questions.

Materials requirement

- Discussion question PowerPoint
- Whiteboard and marker
- Interactive Whiteboard (for viewing images)

Time requirement

One assembly to introduce the subject to the whole school (20 minutes), then one session of 30 minutes.

Timing	Activity
10 minutes	**Opener: Why is clean air important?** 'Why do we need safe, clean air?' Ask children to jog on the spot for one minute – set a timer. Ask them what they notice about their breathing. Why is it faster? Why is it important that the air we breathe is clean? Helps us to stay fit and healthy, better for our lungs, less chance of developing breathing problems, etc. Using the discussion questions slideshow (slides 1 – 3), as pairs, then tables, discuss the questions. Come together as a whole class to share ideas – at this stage make sure to allow children to share misconceptions, but discuss and correct them with help from the children if possible, or as the class teacher.
20 minutes	**Class discussion:** **What stops our air being clean?** Show children pictures on slideshow (Handout 1, slides 4 – 9) – can children decide in pairs which pictures show clean air and which show air pollution? How can they tell? Children mark each picture on Handout 1 with a **C** for Clean or **P** for Polluted. You may wish to create a poster / whiteboard page of the children's ideas and responses.
5 minutes	**Plenary:** Go through the pictures and give answers - slides 5 and 7 show clean air, the other pictures all show polluted air. Explain that during the next few lessons, we will look at what can stop the air at school from being clean and how we can protect ourselves from air pollution. If offered, take note of the children's suggestions and see if they are correct in the next lesson. **Lesson Resources:** Resource: Discussion questions slideshow (slides 1 – 9), Interactive Whiteboard (Where an IWB is unavailable print out the slides to use as discussion starters), Handout 1 Optional: Use the Virtual Reality App & 360 degree video to find out more about sources of air pollution Key Words: Air pollution, traffic, vehicles, emissions, health, asthma, diesel, petrol

Additional activity for Part 1:

Idling survey – Handout 2

Is car idling contributing to air pollution around your school? 'Engine Idling' is when car engines are left running for over two minutes while not moving. Idling contributes to local pollution. You can monitor idling by counting the number of vehicles outside your school that are idling. Parents dropping off or picking up or children at the start or end of school could be once source of engine idling. You will be counting cars in two 15 minute blocks.

1. In a group of three, choose who will be:

    a) **Observer:** looks for parents' cars that are idling and not idling and tells the Timer.
    b) **Timer:** uses a stop watch to time if cars have been idling for at least one minute.
    c) **Recorder:** puts one dash in the column 'Number of cars idling' every time the Observer and the Timer find an idling car, and one dash in the column 'Number of cars not idling' every time the Observer spots a parked car that is not idling.

2. At the end of 15 minutes, the Timer tells the Observer to stop counting and the Recorder writes the finish time in the column 'End Time' (e.g. 8:45 am). Add up the number of cars idling and not idling and record this in the 'total' column.

3. After a 1 minute break, you can swap jobs. Repeat steps 1-6 and record your findings in the second row.

4. When you finish counting cars for the second time, add up all the cars idling and put this number in the 'total, column on the bottom row. Add up all the cars not idling and put this number in the 'total' column on the bottom row.

5. Steps 1-4 can be repeated again in the afternoon.

PART 2 – EXPERIMENT

You can measure the success of your awareness campaign in a variety of ways. The number of pollution sources, idling vehicles, cars in the car park and people walking to school could all be used as indicators of the impact.

It's important to take a baseline measurement before your event and a second measurement afterwards to understand the difference your campaign has made. You can use the data collection table (Handout 3) below to help with your measurement.

Try to choose locations to monitor adjacent to busy roads that border your school grounds. The more traffic the children can see, the greater their understanding of problems caused by air pollution will be.

Timing	Activity
10 minutes	**Opener: Recap discussions from previous lesson** In this session students will explore and collect data related to different sources of pollution, both inside and outside the school. Show children the sources of pollution information sheet (Handout 3, slide 10) – using the pupils' ideas discuss the different types of pollution sources we could see in different areas of the school – how does each different source give off pollution? Give examples – roadworks giving off dust and dirt through digging / drilling, emissions from vehicle exhausts, etc.
30 minutes	**Data collection** Share the data collection sheet (Handout 3) with the class and discuss which area of the school might be the best to use for this task. Remind the children of the need to find an area inside school grounds but close to a main road. Let children suggest areas to survey – guide towards busy areas like the main school entrance or a playground adjacent to a local busy road. Once you have decided on an area spend 10-15 mins in that area monitoring.

10 minutes	**Plenary:** When you have collected your data look back at the discussion slideshow again (slides 10 – 15) and try to focus on these questions: What can we all do to try to avoid air pollution? *Walk / scoot / cycle, use public transport instead of cars, avoid idling* What could we do to reduce the amount of pollution we produce? *As above, use less electricity, encourage parents to buy hybrid / electric cars, plant trees, etc.* How could we reduce air pollution here at school? *Use active travel to travel to and from school instead of coming in car, avoid idling, plant trees, tell others (pupils & parents), etc.* **Lesson Resources:** Resources: Discussion questions slideshow, Handout 3 - Sources of pollution and data collection sheet

Timing	Optional Activity – Lichen Bio-Indicator Observation (60-90 Minutes)
15 minutes	**What is lichen?** A lichen is made up of two organisms living together: a fungus and an alga. Lichens usually attach themselves to trees but you can also find them on other surfaces, such as park benches. **What's so special about lichen?** There are lots of different types of lichen – they come in all sorts of shapes, sizes, and colours – and different types of lichen like different types of air! •Nitrogen-sensitive lichens only live in clean air •Nitrogen-loving lichens can live in dirty air •Some lichens are not affected by air quality and can live anywhere Which means that you can work out if the air around you is polluted by looking at the types of lichen you can see growing.
30 minutes	**Data collection - Lichen Bio-Indicator Observation (Use Handout 4)** Instructions: 1. Some lichens change colour in the rain. This could make it more difficult for you to work out what type they are, so if possible try to do the survey when the weather is dry. 2. Try to find sites with deciduous trees, such as oak and ash, and lots of light. 3. Choose four trees which you want to study. Trees with a single trunk are best. 4. On the survey sheet, record the total amount of each type of lichen you can see on the side of the tree trunk you've chosen. • If there's none of that lichen type, tick the red light. • If you see a small to medium amount (less than 1 sheet of A4 in total), tick the amber light. • If you find a large amount overall (more than one A4 sheet in total), tick the green light. Alternatively, if you'd like to record the amount of lichen you spot in more detail, you could use a scale from 0 to 5, with 3 representing roughly half an A4-page of lichen. You could also take photos of the different types of lichen the children find to use and discuss in class.

10 minutes	**Plenary:** Once you are back in the classroom look at the results you've collected. Can you decide what you think it's telling you about the amount of pollution in the air around you? Remember, the more pollution-loving lichen you saw, the more polluted the air is likely to be. If your study has shown you that the air around you is probably polluted, can you think what might be causing the pollution? Refer the children back to the causes of pollution work done previously. **Lesson Resources:** Resources: Survey sheet (Handout 4), a pencil Optional: Take a map and a camera, so that you can mark the areas you've studied and take photos of the lichen you find.

PART 3 – CREATE

In part three of the toolkit, your pupils will create their own Clean Air Superhero, and think about what special powers their hero could have to help to protect us and the environment from air pollution

Finally, your class will start to think about how to make a positive change in their local air quality by telling other pupils why clean air is important.

Materials requirement
- Printed copies of the 'My Clean Air Superhero' template – Handout 5
- Pencils, pens, colouring pencils

Time requirement
One session of 50 minutes, plus any additional time for finishing off.

Timing	Activity
10 minutes	**Opener: What have we learned about air pollution so far?** Today's challenge! Can you design their own Clean Air Superhero? In groups, discuss what the superhero could do for your school, city and country, and even for the world. Share ideas with the class.
30 minutes	**Class activity: Design your Clean Air Superhero** Using the template (Handout 5), children to draw a picture of their superhero. Encourage the children carefully about the emblem they could have on their costume. Now the children need to decide on their Superhero's name, what super powers they will have and explain how they will protect people from polluted air. Once they have finished their writing they can colour in their designs.
10 minutes	**Sharing their designs** Once your class have finished their designs come together to ask the children to share their work. Can they explain their designs and the choices that they have made? What are their super powers and how can they help to protect the air around us?

PART 4 – TAKE ACTION

Encouraging behaviour change

In this session, your class will think about communication, campaigning and encouraging behaviour change in their own lives and in the community.

Your class will think about how to spread the message about the importance of air quality and sustainable travel. They will create posters to let people in and around school know why clean air is so important.

This final activity builds on the previous learning and asks pupils to think about why clean air is important to us all.

Materials requirement

- 'Clean air is important to me because…' and Clean Air Day logo posters – see Clean Air Day website
- Optional: Use all of the resources from the Clean Air Day website
- Pens or pencils

Time requirement

This lesson takes 50 minutes, but you may wish to extend the activities started in it over another lesson.

Timing	Activity
15 minutes	**Group activity: Communicating a message** Explain that every year, schools across the UK take part in Clean Air Day. Students, teachers, parents and the local community take action to reduce and avoid air pollution. To raise awareness around the school, we are going to create posters letting people know why clean air is important. Students could use the 'Clean air is important to me because…' and Clean Air Day logo posters, or design their own posters. In small groups / pairs, children to thought shower ideas for their posters. What message do we need to get across to the rest of the school? Use active travel (walk, scoot, cycle), conserve energy, use public transport, etc.
30 minutes	**Group activity: Poster design** Ask the children to feed back to the rest of the class and share their ideas. Address and correct any misconceptions. Put any good ideas / catchy slogans on the Interactive Whiteboard for all children to be able to use. Remind them to think about their message: do they want to tell people to avoid idling, pollution, drive less and walk more, car share, use public transport more? Now it's time to design our posters. First, if there is time, have the children plan their poster on a whiteboard or piece of scrap paper. Make sure the children have access to appropriate equipment – pens, pencils, etc. The children will then create their final poster design (This may take more than one lesson). After they have done this, ask each group to feed back to the class, sharing their posters and explaining why they chose their design.
5 minutes	**Close: What Next?** Your class have learned about air quality, carried out experiments, analysed the data and thought about what to do about it. You now need to decide as a class what the next steps could be (see Handout 6 – Taking Action).

Handouts and Appendices

Handouts:

- Handout 1: Clean or Polluted Pictures
- Handout 2: Car idling survey
- Handout 3: Sources of pollution and data collection sheet
- Handout 4: Lichen Bio-Indicator Observation
- Handout 5: My Clean Air Superhero
- Handout 6: Taking action

Appendices:

- Appendix 1: Assembly notes
- Appendix 2: Hands up survey
- Appendix 3: Parental consultation

HANDOUT 1 – CLEAN OR POLLUTED?

Use a **C** for clean air or a **P** for polluted (dirty) air.

=_____

_____=

=_____

_____=

=_____

_____=

HANDOUT 2: IDLING SURVEY

Idling Survey Record Form

School: . . . . . Date: . . . . . .

Location: . . . . . .

Supervisor: . . . . . .

Observer: . . . .

Timer: . . . . . .

Recorder: . . . . . .

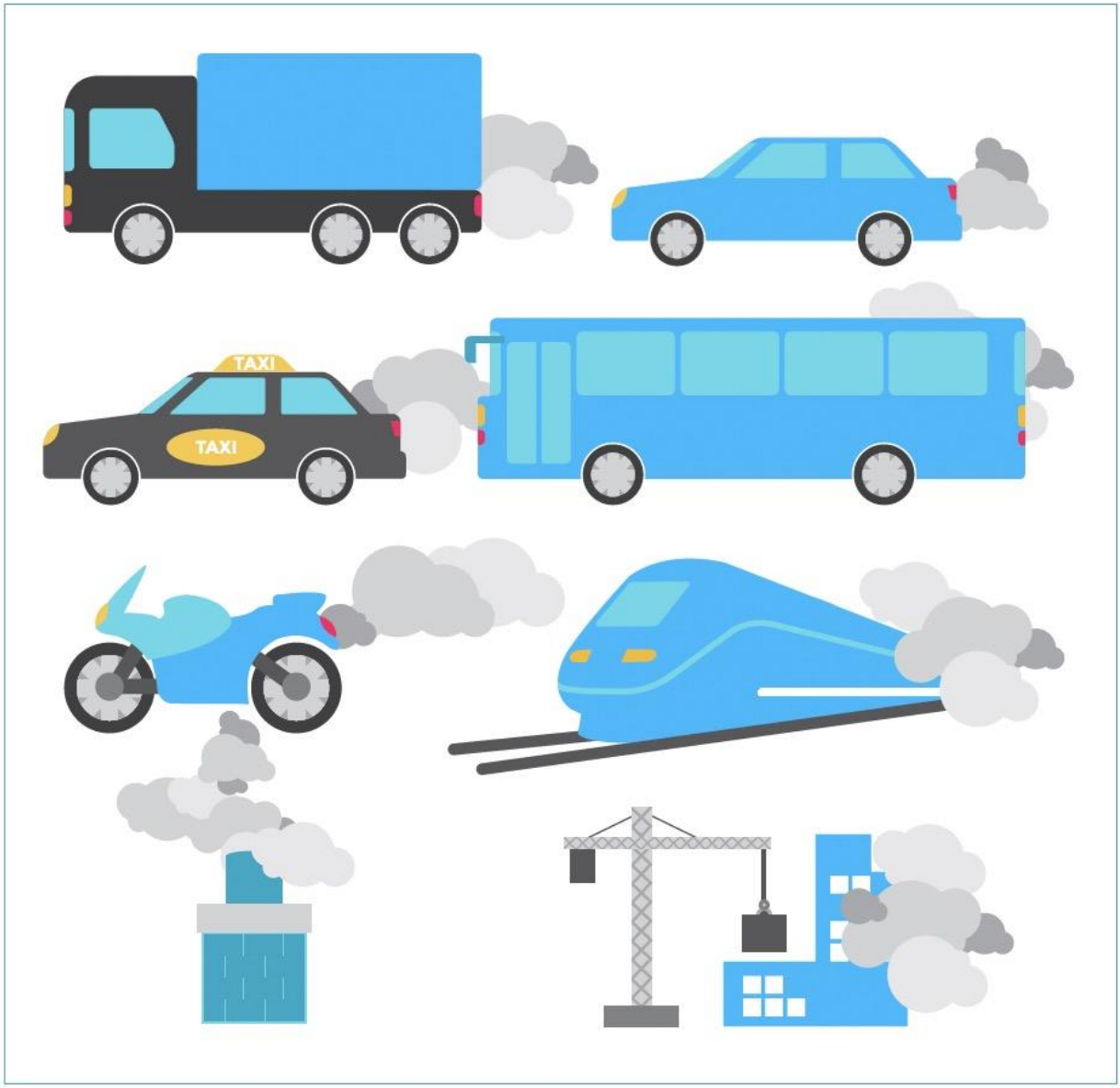
Start Time	End Time	Number of cars idling	Total	Number of cars not idling	Total

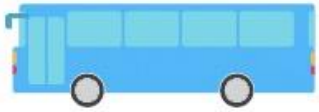
Total number of cars idling: . . . . . .

Total number of cars not idling: . . . . . .

HANDOUT 3: SOURCES OF POLLUTION AND DATA COLLECTION SHEET

Sources of pollution: what to look out for…



Source of pollution	Number
	
	
	
	
	
	
	
	

HANDOUT 4: LICHEN BIO-INDICATOR OBSERVATION

(Duration of activity: 1–1.5 hours)

What is lichen?

A lichen is made up of two organisms living together: a fungus and an alga. Lichens usually attach themselves to trees but you can also find them on other surfaces, such as park benches.

What's so special about lichen?

There are lots of different types of lichen – they come in all sorts of shapes, sizes, and colours – and different types of lichen like different types of air!

- Nitrogen-sensitive lichens only live in clean air
- Nitrogen-loving lichens can live in dirty air
- Some lichens are not affected by air quality and can live anywhere

Which means that you can work out if the air around you is polluted by looking at the types of lichen you can see growing.

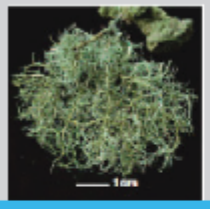
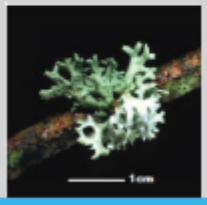
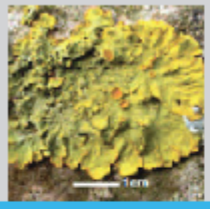
What you'll need for your observation:

- Your survey sheet
- A pencil

You could also take a map and a camera, so that you can mark the areas you've studied and take photos of the lichen you find.

Instructions:

1. Some lichens change colour in the rain, which could make it more difficult for you to work out what type they are, so try to do the survey when the weather is dry.
2. Look for a site with deciduous trees, such as oak and ash, and lots of light.
3. Choose four trees to study. Ones with a single trunk are best.
4. On your survey sheet, record the total amount of each type of lichen you can see on the side of the tree trunk you've chosen.
    - If there's none of that lichen type, tick the red light.
    - If you see a small to medium amount (less than 1 sheet of A4 in total), tick the amber light.
    - If you find a large amount overall (more than one A4 sheet in total), tick the green light.
    - If you'd like to record the amount of lichen you spot in more detail, you could use a scale from 0 to 5, with 3 representing roughly half an A4-page of lichen.
5. Look at the results you've collected (you can do this back in your classroom) and decide what you think it's telling you about the amount of pollution in the air around you. Remember, the more pollution-loving lichen you saw, the more polluted the air is likely to be.
6. If your study shows that the air around you is probably polluted, can you think what might be causing the pollution?

	How much of the tree was covered by each lichen type?				
	Example	Tree 1	Tree 2	Tree 3	Tree 4
	The Pollution Haters				
 Usnea					
 Evernia					
 Hypogymnia					
	The Pollution Lovers				
 Leafy Xanthoria					
 Cushion Xanthoria					
 Physcia					

HANDOUT 5: MY CLEAN AIR SUPERHERO

Name:

Super powers:

How my hero protects people:

HANDOUT 6: TAKING ACTION

- BE A STAR
  Sign up your school to Modeshift STARS (Sustainable Travel and Recognition for Schools).

- GO GREEN
  Introduce a Go Green reward scheme.

- PUPIL POWER
  Introduce the School Travel Ambassador scheme, where pupils promote sustainable and active travel.

- CLEAN AIR DAY
  Take the pledge to improve clean air around your school!

- ADVERTISING CAMPAIGN
  Plan, create and run an advertising campaign in your school, at the school gates, or in your local community. Make posters using persuasive writing.

- SUMMER FAIR
  Take your learning public and host a stall at your summer fair to spread the word about air quality.

- WALKING BUS
  Start a walking bus: where children and volunteers walk in a group, picking up or dropping off 'passengers' at specific 'bus stops' on their school route.

- PARK and STRIDE
  Introduce a park and stride for pupils that live too far to walk or cycle to school, where parents/carers park a minimum of 500mtrs away from the school entrance and walk/scoot into school.

- PHYSICAL ACTIVITY
  Take part in Leeds City Council's Bike to School week, Walk to School week or Scootember.

- CAR FREE DAY
  Arrange a day where everyone leaves their car at home and travels to school sustainably.

- PTA Power
  Ask your Parent Teacher Association or Governors if you can give them a short presentation at their next meeting - can they help in your quest to promote sustainable travel and improve air quality?

- Walkit.com - Log on to www.walkit.com select 'Leeds' and enter your home postcode and the school postcode. This will plan your route and will tell you the distance you have travelled, the time it takes, calories burned and C02 saving.

APPENDIX 1: ASSEMBLY NOTES

There are many activities in our day to day lives which contribute to air pollution.
Air pollution can be caused when we burn fossil fuels, such as coal, natural gas, petrol or diesel. We use these energy supplies for all sorts of things, from cooking and washing, to lighting and heating our homes and schools, and travelling by car.

The most concerning pollutants in the air are nitrogen dioxide (NO2) and particulate matter (PM), or particulates. Other pollutants can include ozone (O3) and sulphur dioxide (SO2).

Nitrogen dioxide (NO2): Breathing this in can irritate and damage the lining of the lungs. You can't see or smell NO2 in the air, except in very warm weather when it sometimes combines with other chemicals in the air and makes the sky look hazy and brown.

Particulate matter (PM): Particulates are tiny particles of dust, soot or liquid which are too small to see. When you breathe these in they can sometimes go deep in to your lungs and the smallest can even pass into the bloodstream.

Air pollution in the past – the Great Smog in London

Even before there were so many cars on the roads, London suffered from the effects of air pollution. Since the Industrial Revolution, in the 18th century, factories sprang up, producing pollution in the form of smoke.

When smoke and fog mixed together, they made 'smog', which made the air hard to breathe, and also makes it difficult to see. Smog was very bad in 1952, a period of time which became known as the Great Smog. During the Great Smog in London, around 8,000 to 12,000 people died from causes related to the levels of pollution in the air.

Air Pollution in the present

The biggest problem for air pollution today is the emissions from road transport particularly vehicles that use diesel fuel. Even the newest diesel cars can omit 5 times more Nitrogen Dioxide (N02) particles than petrol cars. Unlike the great smog in London in 1952 todays pollution cannot always be seen, N02 is invisible and odourless and particulate matter (small particles) are too small to be seen.

APPENDIX 2: HANDS UP SURVEY 'PUPIL'

Conduct a "hands up" travel survey during your school assembly, recording the responses in the tables below. This will give a baseline of data, letting you see your progress as your Air Quality projects go on.

Survey date: . . . . . Number of pupils present: . . . . . .

School year(s) surveyed: . . . . . Class(es) surveyed: . . . . . .

How do you **usually** travel to school?

Type of transport	Count
Walk (including, rollerskates, skateboard, etc)	
Cycle	
Scooter	
Car or van to the school entrance (not sharing)	
Car or van to the school entrance (travelling with others)*	
Park and walk (not sharing)	
Park and walk (travelling with others)	
Bus	
Rail	
Other	
Total	

* People who do not live at your address

How would you **most like** to travel to school?

Type of transport	Count
Walk (including, rollerskates, skateboard, etc)	
Cycle	
Scooter	
Car or van to the school entrance (not sharing)	
Car or van to the school entrance (travelling with others)*	
Park and walk (not sharing)	
Park and walk (travelling with others)	
Bus	
Rail	
Other	
Total	

* *People who do not live at your address*

APPENDIX 2: HANDS UP SURVEY 'STAFF'

Conduct a "hands up" travel survey during your staff meeting, recording the responses in the tables below. This will give a baseline of data, letting you see your progress as your Air Quality projects go on.

Survey date: . . . . . .

School year(s) surveyed: . . . . . .

How do you **usually** travel to Work?

Type of transport	Count
Walk	
Cycle	
Car or van (not sharing)	
Car or van (travelling with others)	
Bus	
Rail	
Park and Ride	
Other	
Total	

How would you **most like** to travel to work?

Type of transport	Count
Walk	
Cycle	
Car or van (not sharing)	
Car or van (travelling with others)	
Bus	
Rail	
Park and Ride	
Other	
Total	

APPENDIX 3: THE SCHOOL JOURNEY

Parental Consultation

Please complete the following questions on your child's journey to school.

The information you give us will be used to improve school journeys/air quality around your school

. . . . . .

Q1. How far from school do you live?

Under 1 mile ☐

1-2 miles ☐

Over 2 miles ☐

. . . . . .

Q2. How does your child usually travel to school?

Walk ☐ Scooter ☐

Cycle ☐ Car Share ☐

Car ☐ Bus ☐

Other . . . . . .

. . . . . .

Only complete this section if you use your car for the school journey

Q3. What is your usual destination after dropping your child off in the morning?

a. Work (every morning) ☐ b. Work (some mornings) ☐

c. Home ☐ d. Other ☐

If you travel to work after dropping your child at school, do you travel by car into Leeds City Centre? (or within a 1 mile radius).

Yes ☐ No ☐

Q4. Would you be willing to take part in any of the following initiatives to support the School Travel Plan and improve air quality? *(Please circle)*

Walking bus	Car sharing	Park and stride
5 minute walk zones	Cycling to school	School walking week
School bike week	Safe parking promotion	Reward schemes
Walk Once a Week (WOW)	No Idling Zone	Scoot to School
Parking pledge	Incentives to walk/cycle	School Travel Ambassador

Q5. If you think that part of your child's journey is dangerous, tell us where and why.

Q6. Are you concerned about the impact of air pollution on your child's health?

Not concerned	☐	Slightly concerned	☐
Very concerned	☐	Don't know	☐

If you have any other suggestions on how the school journey /air quality could be improved please share these ideas with us.