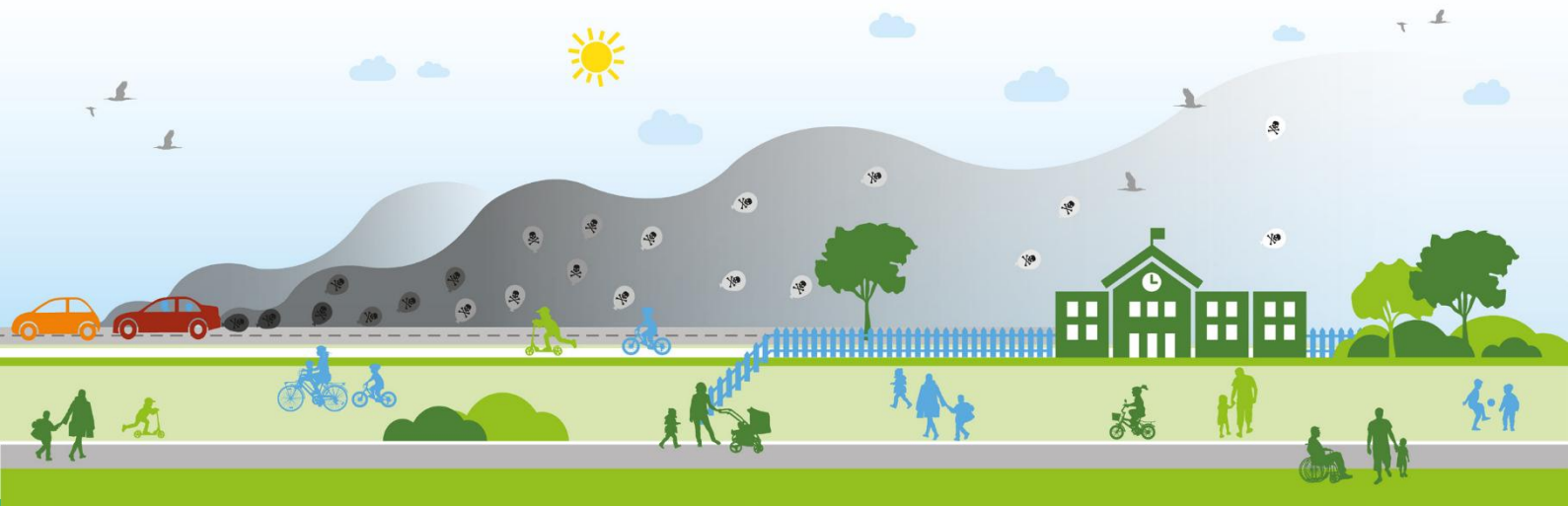


CLEAN AIR SCHOOLS

Teachers' Toolkit



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Introduction

Why is air pollution an issue?

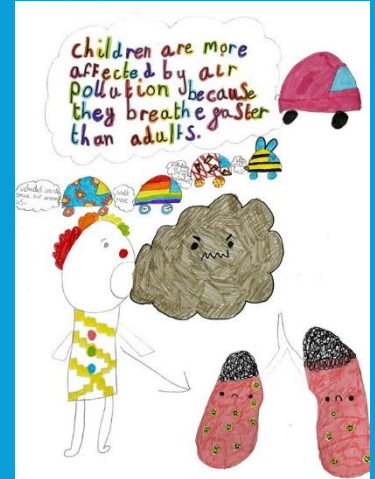
There is overwhelming evidence that air pollution harms our health. Each year in the UK around 40,000 deaths [\(1\)](#) are linked to poor air quality, and it is not something that affects just the big cities. The most obvious affects are on our breathing; increasing the risk of asthma attacks, inflammation of the lungs, and can stunt the growth of children's lungs. It is also linked to heart disease, strokes and cancers, amongst other serious conditions.

Kate Salter (Air Quality officer for Walk Wheel Cycle Trust) says;

"Children are particularly vulnerable to this invisible danger as their organs and immune system are still developing. Children breathe faster than adults and they tend to be closer to the height of exhaust emissions. Exposure to air pollution puts them at greater risk of developing asthma and increases frequency of asthma attacks."

Motorised vehicles are one of the main contributors to poor air quality near schools. At the start and end of the school day, air pollution usually deteriorates significantly as many vehicles appear. Often drivers don't turn vehicle engines off which adds unnecessary pollution to the air.

A single idling engine can release up to 150 balloons worth of harmful chemicals per minute (including cyanide, nitrogen oxides and particulate matter (PM)). These toxic gases and PM move into the playgrounds and school grounds. Research carried out for UNICEF [\(2\)](#) shows that children are exposed to higher doses of pollution during the school run and whilst they are at school, particularly when they're in the school playground.



So, how can you help improve it?

Our children deserve clean air to breathe, so it is vital to bring pollution levels down.

We can improve air quality by encouraging greater numbers to walk, wheel, scoot or cycle to school, but this behaviour change takes time and for some isn't always an option. Reducing idling can create a quick and effective change resulting in improved air quality.

Running an anti-idling campaign at your school is a great first step to start improving the air quality around your school. You can do this by using this 'Clean Air Schools' toolkit which particularly focuses on reducing idling.

In here you'll find everything you will need to run the campaign, including a set of off the shelf resources (which link to the Curriculum for Excellence) to help children, their families and staff learn about air quality and encourage simple actions to help to reduce air pollution in their vicinity.

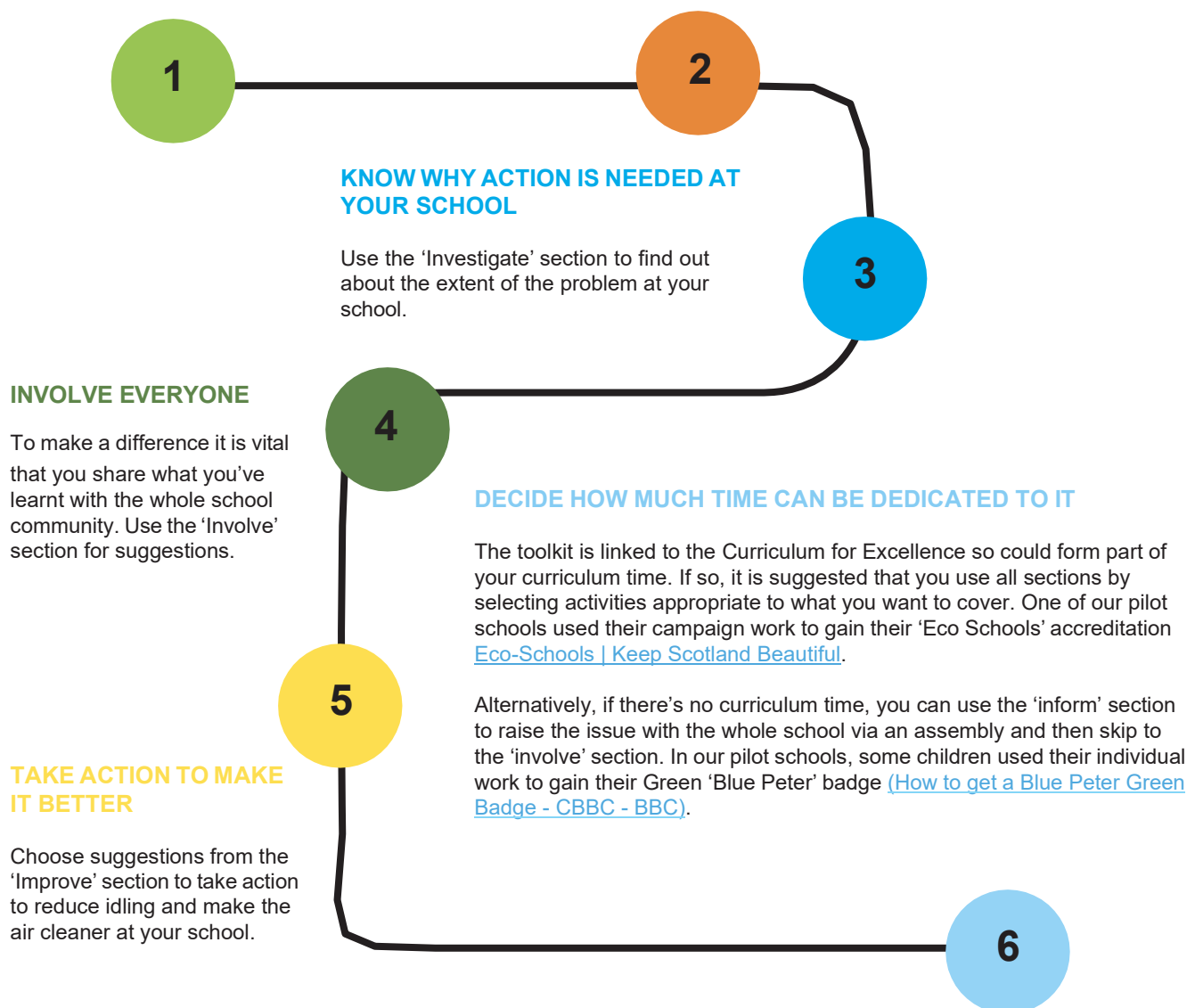
How to use this toolkit:

SELECT A GROUP TO RUN IT

Pick a group of pupils to run it – this is a perfect activity for a school council or eco club. On a larger scale it could be a whole year group doing an environment topic or a topic to get passionate about for persuasive writing.

IDENTIFY THE PROBLEM

Use the toolkits 'Inform' section to educate your campaign group and yourself about air quality and idling.



Below are YouTube videos of a narrated presentation which can be used to raise the pupils' knowledge and awareness about air quality and how idling can affect it. This could be a whole school or year group assembly or could initially just be shown to the campaign group. [Here](#) is one for lower primary school aged children and [here](#) is a longer, more in depth one (including the health impacts) for upper primary school aged children.

[Here](#) is the Lower Primary PowerPoint and [here](#) is the Upper Primary PowerPoint (which are the basis of the videos), so you can deliver it yourself or edit it to add slides once the children have investigated the air quality at your school.

The videos can be used alone, but for a more interactive assembly you could:

- Do a breathing meditation. A good one is either the 'five finger breath' or the 'square breathing' meditation. The best time to do this is when you pause the video at 1:04.
- Get your own transparent balloons (you need a hand pump to inflate these), or empty clear storage/food boxes to show the children. For older classes: you could add labels on the back of the clean air one saying 'nitrogen' and 'oxygen' and on the dirty air one saying 'nitrogen dioxide' and 'particulate matter'.
- Upper primary only: provide blank, white label stickers for the children to use to show which parts of their bodies they think are affected by air pollution. If it's more than one part, they can rip the sticker up into as many pieces as they need and stick it on all the parts they think are affected.
- Provide some standard balloons (and a balloon pump or two) to have a little competition to see how many balloons the teachers can pump up in a fixed amount of time (best done after slide 5 'What is idling' once children have guessed the number of balloons made in one minute).

**Guide to the video
for Lower
Primary:**

The video is 6 minutes long. The suggestion is to allow 15 minutes to allow time for discussion. Below is a list of time stamps at which you should pause the video to get feedback from the children. Pause at these times to allow children to make a decision or answer a question:

01:04 – What do we do with air and why do we need it?

01:30 – Ask children to decide if they want to breathe in balloon A or balloon B?

02:33 – Where does air pollution come from?

04:18 – How many balloons of exhaust gases do you think a car makes when it is left idling for one minute?

05:09 – What can we do to make the air we breathe cleaner?



Photo Credits - Kate Salter/ Walk Wheel Cycle Trust

**Guide to the video
for Upper
Primary:**

The video is 7 minutes long. The suggestion is to allow 15 minutes to allow time for discussion. Below is a list of time stamps at which you should pause the video to get feedback from the children. Pause at these times to allow children to make a decision or answer a question:

01:04 – What do we do with air and why do we need it? The information given is simplified to keep it short but for upper primary aged children, you can talk about the fact that we breathe to take in oxygen which our bodies need to get energy out of the food we eat; and to get rid of carbon dioxide which is toxic in high concentrations.

01:29 – Ask children to decide if they want to breathe in balloon A or B? What parts of our bodies need air/oxygen? What would happen if we did not have clean air to breathe?

03:18 – Which parts of your body do you think air pollution affects?

03:49 – Where does air pollution comes from? After this slide you could ask the children whether we need to worry about air pollution now that electric cars are being introduced? The answer is that unfortunately we do; although electric cars don't produce nitrogen dioxide, they do make particulate matter from their brakes and tyres.

05:34 – How many balloons of exhaust gases do you think a car makes when it is left idling for one minute?

06:26 – What can we do to make the air we breathe cleaner?

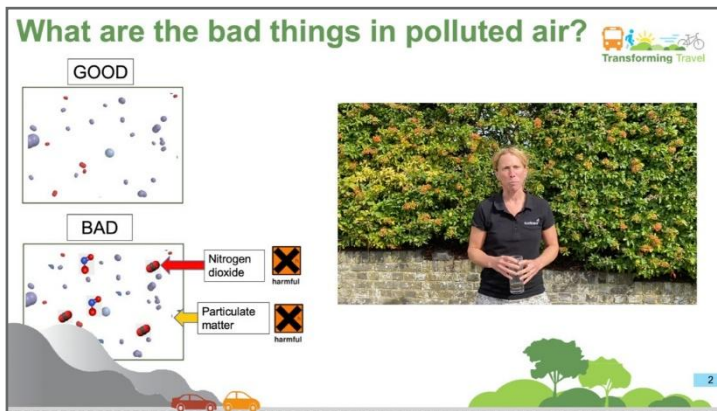


Photo Credits - Kate Salter/ Walk Wheel Cycle Trust

The two key questions you may be asked are regarding electric cars and if you're less exposed to air pollution if you are inside a car. Whilst electric vehicles produce no nitrogen dioxide, they still generate 'particulate matter' which is the air pollutant linked to many health impacts. Studies have shown that air pollution levels are far higher inside a car than outside. If you'd like to know more and increase your own knowledge of air quality before delivering this, please refer to the 'further reading and useful websites' section towards the end of the toolkit.

Curriculum for Excellence Links:

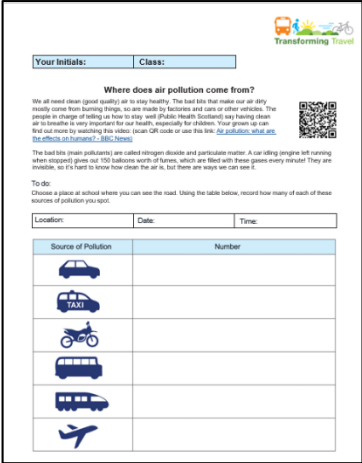
Literacy and English	Listening & talking LIT-02,04,07; Reading LIT-13,17.
Numeracy and Mathematics	Number, money & measure MNU-02,03,10,11; Information handling MNU-20.
Sciences	Biological systems SCN-12,13.

Activities + Learning

Here's a chance for some real-life science, maths and geography where children can find out about the quality of the air they are breathing. Air pollution is invisible to the naked eye but there's lots of different activities they can do to investigate how much there is at your school. Each activity is a self-explanatory work sheet and is designed so that you can do one, all or none of them.



Photo credits: Joe Lindsay/ Walk Wheel Cycle Trust

Activity	Information / Guidance
<p>Where does air pollution come from?</p> <p>Curriculum Links:</p> <p>Literacy – Listening & talking LIT-02; Reading LIT-14,16.</p> <p>Numeracy – Number & number processes MNU-03, time MNU-10; Information handling MNU-20.</p> <p>Social studies – People, place & environment SOC-08,09.</p>	<p>This will allow children to conduct a simple survey to identify what is creating the air pollution at the school.</p> 
<p>Lichen hunt</p> <p>Curriculum Links:</p> <p>Science – Planet Earth SCN-01, 03.</p> <p>Social studies – People, place & environment SOC-07, 08,14.</p> <p>Numeracy – Information handling MNU-20.</p>	<p>Lichen are living things that can give us an indication of how much nitrogen dioxide (an air pollutant from cars) there is in the air. This worksheet gives the children some information on lichen and gives them a simple activity to do to get an idea of how clean the air is around the area of the school.</p> <p>Note: This is very simplified so that it is accessible for primary aged children. Using lichen to scientifically establish the air quality relies on correct identification of species of lichen. Some species are nitrogen sensitive (only grow when nitrogen dioxide levels are low) and others are nitrogen loving (grow when nitrogen dioxide levels are higher) so the presence of them gives an idea of levels of nitrogen dioxide in the air. If conducting this with older children, this (Lichen ID OPAL) sheet is a more accurate methodology. An added challenge when using this, is that lichen change colour when wet, so you must conduct this survey in dry weather.</p>



Using hand lenses or microscopes to magnify the lichen adds another dimension to the children's experience of studying those they find.

In all of the pilot schools, we only found crusty lichen and unless the school is in a rural location, this is the likely outcome of your hunt. If time allows, it might be worth finding in advance some samples of leafy and bushy lichen (from woodlands or coastal areas with few roads) so they can study real examples. These are easy to find on the ground, so no need to harm any trees when collecting your samples.

Exploring your air

Curriculum Links:

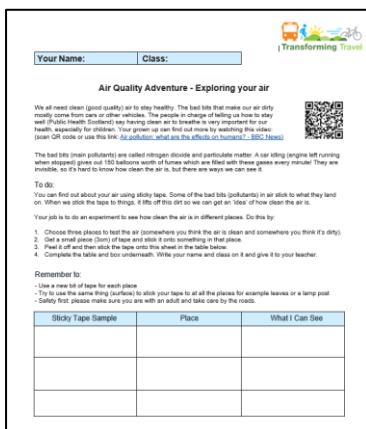
Social studies – People, place & environment SOC-07,08,14.

Science – Body systems & cells SCN-12,13.

Technologies – Technological developments on society & business TCH-06.

[This](#) activity guides children to visualise the particulate matter (the air pollutant created from brake and tyre wear) present in their air in different locations. Particulate matter 2.5 and 10 are microscopic so can't be seen with the naked eye. If you have microscopes or hand lenses available, you could get the children to look at the sticky tape samples using these. However, even without, this activity can give a good visual representation of the amount of 'dirt' (soot) in the air. There is a far more detailed, scientific method available here: [Method for Air Pollution – Field Studies Council \(field-studies-council.org\)](http://www.field-studies-council.org/).

Note: This could be combined with an introduction to how we breathe to form a lesson. To do so, purchase a head of broccoli. Break it up into florets and hand it out to the students. Get them to describe it. They should observe that the stems of the broccoli start off wide and then split into narrower ones before ending in (flower) buds (these are the green lumps on the end). This is just like our lung structure with the wider stems being comparable to bronchi; narrower ones to bronchioles and the buds representing the alveoli. You can then describe the cilia and their function and explain that particulate matter is so small, it can go straight past this line of defence.



Idling counts

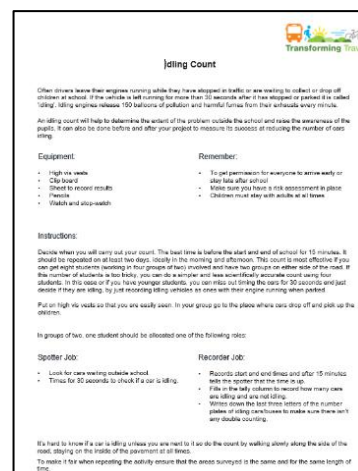
Curriculum Links:

Literacy – Listening & talking
LIT-02; Reading LIT-14, 16.

Numeracy – Number & number processes MNU-03, time MNU-10; Information handling MNU-20.

Social studies – People, place & environment SOC-08,09.

[This](#) is a method for finding out the extent of idling in the school locality. Run before and after idling counts so that you can measure the success of your campaign. This activity will need the adults to guide the children through it and supervise them closely.



Diffusion tubes

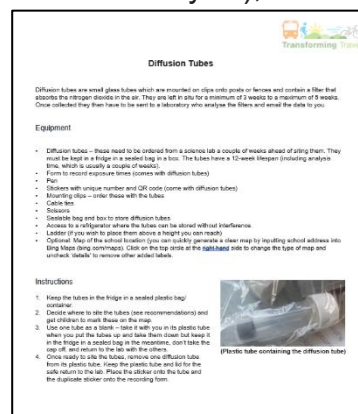
Curriculum Links:

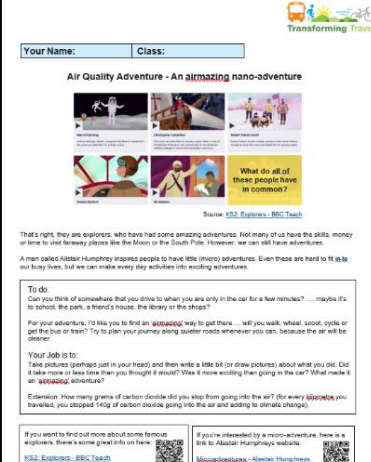
Social Studies – People, place & environment SOC-07, 08,09,14

Science – Planet Earth SCN-04,05.

Technologies – Technological developments in society & business TCH-06.

Using diffusion tubes is a fantastic way of engaging the students by allowing them to do real data collection to discover how clean their air is. You'll need some funds to cover the cost of purchasing the tubes (which includes data analysis), for clips and for postage of the tubes back to the lab for analysis. You'd need to budget approximately £10 per tube. They measure average nitrogen dioxide levels in an area. [Here](#) is an information sheet to provide you with further information on these.



<p>An Airmazing Nanoadventure</p> <p>Curriculum Links:</p> <p>Expressive Arts – Art & design EXA-03,05.</p> <p>Literacy – Writing LIT-29.</p> <p>Health and Wellbeing – Physical wellbeing HWB-18; Physical activity & sport HWB-25.</p>	<p><u>This</u> task is to try to encourage families to trial switching a car journey to an active one (walking/wheeling/cycling/scooting/skateboarding) using clean air routes.</p> <div data-bbox="1018 510 1412 992">  </div>
<p>Further support</p> <p>Curriculum Links:</p> <p>Social Studies – People, place & environment SOC-08, 09,14.</p> <p>Science – Planet Earth SCN-04,05; Topical science SCN-20.</p>	<p>We have a range of magnifying glasses for looking at lichen and more detailed lichen ID sheets. We may be able to help with access to an air quality sensor giving minute by minute air pollution data, and with funding to help purchase diffusion tubes to measure nitrogen dioxide levels. Please email your local I Bike Officer or ibike@walkwheelcycletrust.org.uk for further information.</p>


Once some of the children know about air quality, have investigated the air quality at the school and understand the impact of idling on it, the key is to tell everyone. Use this section to get the information out and involve the rest of the school community. Effective ways to get people involved:

Assembly

Run a whole school assembly to tell everyone what 'Air quality' is and how to improve it. For the assembly, you could simply use the 'inform' section video or you could combine this with some students telling everyone what they learnt from doing tasks in the 'investigate' section. The children may want to create their own 'inform' video.

Competition

Arrange a competition which gets children to design posters, pledge cards, poems or newspaper articles telling others about air quality and how we can improve it. [This](#) gives some guidance and some examples of good ones. [This](#) gives some information for children to use for their entries. Use the best examples as part of your project to put up around the school as lasting reminders.



Your Name: **Class:**

Facts to share on air quality

We all need clean (good quality) air to stay healthy. The bad bits that make our air dirty mostly come from cars and other vehicles. The people in charge of taking us how to stay well (Public Health England) say that clean air is the most important thing for our health, especially for children. Your grown up can find out more by scanning the code (scan QR code or use this link: [Air pollution: what are the effects on humans? - BBC News](#))

The bad bits (main pollutants) are called nitrogen dioxide and particulate matter. A car idling (engine left running when stopped) gives out 100 tonnes worth of fumes which are then with those gases every minute! They are invisible, so it's hard to know how clean the air is, but there are ways we can see it.

Key words to help you to tell people what air quality is:

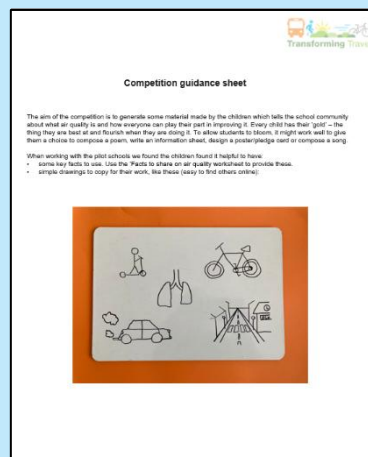
- Cleanliness
- Invisible
- Toxic
- Particulate matter
- Nitrogen dioxide
- Exhaust fumes
- Cars
- Vehicles

Road traffic is one of the main sources of air pollution in Scotland.

Breathing in dirty air is bad for our bodies as it can make us ill.

For the facts in the red, yellow and blue speech bubbles, just choose ONE of each colour to include.

- Children are affected by air pollution more than adults because they breathe lower.
- Children and babies in prams breathe more polluted air because they are closer to car exhausts.
- Air pollution harms children's lungs and bodies because they are still growing.




Competition guidance sheet

The aim of the competition is to generate some material made by the children which tells the school community about what air quality is and how everyone can play their part in improving it. Every child has their 'gold' - the thing they are best at and flourish when they are doing it. To allow students to flourish, it might work well to give them a choice to compose a poem, write an information sheet, design a poster/pledge card or compose a song.

When working with the pilot schools we found the children found it helpful to have:

- some key facts to use. Use the Facts to share on air quality worksheet to provide these.
- simple drawings to copy for their work, like these (easy to find online).



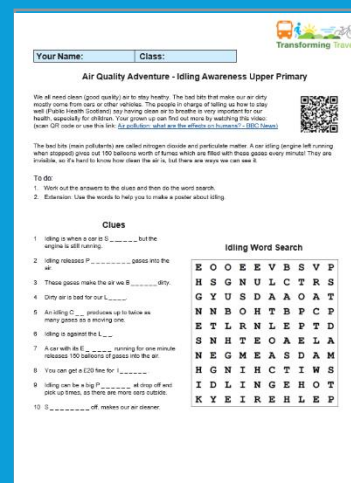
Communicate

Communicate with the school community using paper copies or use your communication channels to get the information out digitally:

- Use [this](#) 'idling impact' leaflet to tell people the impact of idling.
- Use [this](#) 'Idling Awareness' worksheet for Lower Primary.
- Use [this](#) 'Idling Awareness' worksheet for Upper Primary. These give children and their carers information about the impacts of idling. This is particularly good as a homework task to educate the adults. If so, perhaps you can offer a prize draw (with 'free' prizes i.e. extra 'golden time' or 'use the teachers pen for the day' or 'lunch with a teacher') for all entries (completed worksheets).

Tip: our pilot schools found that there was far greater uptake when this was physically printed and put into the children's school bags rather than sent electronically.

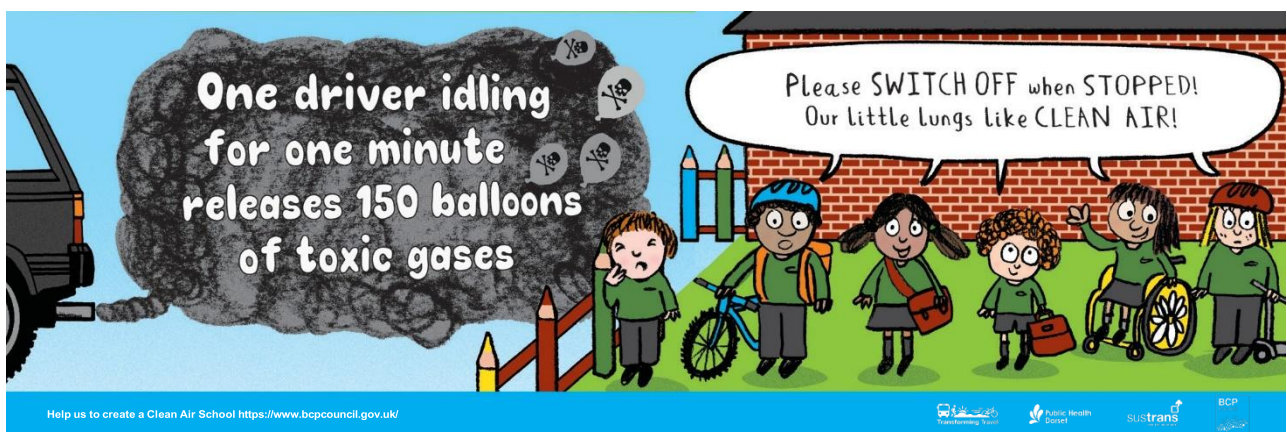
- Keep the best posters/poems from your campaign to send home



physically or electronically (or use [this](#) idling poem written by a year 6 at one of our pilot schools and read by pupils from some of our pilot schools).



- Share some of the website links from the 'further reading and useful websites' section (at the end of the toolkit) with parents/ carers.



Focus Day

Have a 'Clean Air Day' to showcase the learning and work the pupils have done and to focus on how and why creating a 'Clean Air' school is so important. Ideas to reduce idling and improve air quality on the Clean Air Day:

- Have a raffle with a prize draw (using the schools reward systems) to those who actively travel (walk/wheel/cycle/scoot/skate/park and stride) on the day.
- Display the posters/poems/letters/information leaflets that the children have made on the playground/in the school hall and announce the winners of the active travel raffle in the same location so that parents are drawn in.
- Get people to sign a pledge to say what they will do to improve the quality of the air at the school. You could use pledge cards designed by your students but if not, you can use [these](#) produced by children at the pilot schools.

[illegible]

- Give out 'air pollution' information leaflets (or even 'penalty notices') to idling drivers. This could be an envelope with [this](#) 'idling impact' info leaflet inside it or an information leaflet that your own students have designed.
- Include articles about what the children have done in the school's parents and carers' newsletter and include posts on the school's social media accounts.
- In one of the pilot schools the eco club created a video about what they had learnt and activities they had done, which was shared with parents.

Curriculum for Excellence links:

Literacy	Listening & talking LIT-02,03,07,10; Reading LIT-14,16; Writing LIT-24,26,28,29.
Expressive Arts	Participation in performances & presentations EXA-01 Art & design EXA-02,04.
Health and Wellbeing	Social wellbeing HWB-12; Physical wellbeing HWB-15,16; Planning for choices & changes HWB-19.



Photo Credits- Images 1 + 2: BCP Images 3 + 4: Kate Salter/ Walk Wheel Cycle Trust

Once you've raised awareness about air quality and how idling impacts it, to really improve air quality, we need to try to ensure a permanent change in behaviour by promoting the issue.



Photo Credits - Image 1: Kate Salter/ Walk Wheel Cycle Trust Image

2: Emma Cocksedge/ Walk Wheel Cycle Trust

Evaluate the success of your campaign

It is always rewarding to see if your campaign has had an impact. To do so, you can repeat your idling counts (see worksheet in 'investigate section' to find out if idling has become less common). You could also undertake a travel behaviour survey asking the children how they got to school before the air quality campaign and how they now get to school (or how they would like to get to school).

Repeat the campaign

If possible, run your campaign annually. A good time to do so may be in the run up to the UK's 'Clean Air Day' (run by Global Action Plan – see: [Clean Air Day | Action for Clean Air](#)) which is run annually in June. Or for 'World Car Free' day which is annually in mid-September. Get these into the school calendar so there is a date to aim for.

Visual Reminder

It's good to have a visual reminder so that people still remember to play their part in the weeks and months following any campaign. One of the pilot schools decorated 150 wooden balloons and attached them to the fences outside the school to tell people why they shouldn't idle. The local Men's Shed supported the activity by creating the wooden balloons.

Other Creative Ideas

Maybe you have another idea to promote the issue? We'd love to see what you come up with. Please tell us by emailing ibike@walkwheelcycletrust.org.uk or tagging us @WalkWheelCycleTrustScotland if you put your images on social media.

Other Resources

This banner was created by award winning children's illustrator 'Neal Layton'. Neal is especially known for his illustrations of Cressida Cowell's 'Emily Brown' books. Amongst many others, he has produced a book called 'A climate in chaos'. This could be read to the children as an introduction to environmental issues and a reason for an air quality campaign.





Photo Credits - BCP



Photo credits - Image 1: BCP Image 2: Kate Salter/ Walk Wheel Cycle Trust

Promote active travel The key to improving air quality is to reduce the number of cars coming close to the school. This can be done by promoting active travel (walking/wheeling/scooting/skating/cycling) and park and stride. Those who still drive close to the school, can be reminded about the impact of idling.

1. 'Air Quality Ambassadors' - Elect some children to encourage other children to come to school in ways that don't cause air pollution. They could run half termly active travel raffles or golden lock (place a 'lock' on a random bike/scooter) competitions. They could also promote 'Clean Air Day' using ideas from this toolkit or the resources provided each year on this website: [Action for clean air by Global Action Plan](#).
2. 'School travel policy' - Get the leaders at the school to adopt a policy. Attached [here](#) is a template. People are often more engaged if children are involved. [Here](#) is an example of a 'School travel policy' that has been personalised by the children explaining why the school were asking parents/carers to consider how they get their children to/from school.
3. Get involved in national active travel initiatives – Walk Wheel Cycle Trust run the Big Walk and Wheel competition held in March time each year, and a Cycle to School Week in September or October and Living Streets run a Walk to School Week in May. Alternatively run your own active travel day or week when suits you best. For more ideas see the [Walk Wheel Cycle Trust website](#).
4. Request external support – Contact your local I Bike Officer to see what support they can offer schools with promoting active travel. You can also request [Bikeability](#) Training by contacting your local Bikeability coordinator: [Bikeability contacts](#).

References, reading and useful websites

Information	Web Address
A summary of what air pollution is and its effects written by Public Health England	https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution
A blog written by the UK Health Security Agency – like above but with videos explaining some of the information	https://ukhsa.blog.gov.uk/2018/11/14/health-matters-air-pollution-sources-impacts-and-actions/
A report written by doctors on the health impacts of air pollution	https://www.rcp.ac.uk/improving-care/resources/ (reference 1)
UNICEF report on children's exposure to air pollution particularly during the school run	https://www.unicef.org.uk/publications/the-toxic-school-run/ (reference 2)
Air pollution inside cars is higher than outside	https://www.theguardian.com/environment/2017/jun/12/children-risk-air-pollution-cars-former-uk-chief-scientist-warns
Electric cars and air pollution (electric cars still emit air pollution in the form of particulate matter)	https://www.theguardian.com/environment/2017/aug/04/fewer-cars-not-electric-cars-beat-air-pollution-says-top-uk-adviser-prof-frank-kelly
British Lung Foundation – further background on air pollution and its specific impact on lung health	https://www.blf.org.uk/taskforce/data-tracker/air-quality/pm25

A network of people who care about air pollution	https://www.mumsforlungs.org
Charity set up for Ella (a 9-year-old British girl who died from exposure to air pollution) to campaign for clean air for all	https://www.ellaroberta.org/
For an interactive map showing air quality data across the UK.	https://uk-air.defra.gov.uk/interactive-map?region_id=11
For UK Air pollution forecasts	https://uk-air.defra.gov.uk/
For Scottish Air pollution forecasts and air quality information	https://uk-air.defra.gov.uk/ https://www.scottishairquality.scot/latest
The organisation who run the UK's Clean Air Day – will provide date and resources	https://www.actionforcleanair.org.uk/campaigns/clean-air-day
For ideas to promote active travel - Walk Wheel Cycle Trust - the walking and cycling charity	https://www.walkwheelcycletrust.org.uk/for-professionals/education/
The award winning children's illustrator, (known for his illustrations of Cressida Cowell's 'Emily Brown' books) designed the banner for us. Here's a link to information on his work including his 'Climate in Chaos' book, which could be used to start a conversation with children on environmental issues, like air quality.	https://www.arenaillustration.com/artists/neal-layton/

Acknowledgments



Walk Wheel Cycle Trust, the walking and cycling charity, was commissioned by Bournemouth Christchurch and Poole (BCP) Council to work alongside them and Public Health Dorset to develop and deliver the Clean Air School Project. The funding for this came from DEFRA.

Walk Wheel Cycle Trust worked with six pilot schools (Bethany Juniors, Winton Primary, Christchurch Juniors and Infants and Canford Heath Infants and Juniors) to deliver the Clean Air School Project. The lessons, activities, ideas and resources which developed from this project have helped to create this toolkit for all BCP schools to use. The wooden balloon installation couldn't have happened without the help and assistance from Poole Men's Shed.

Thank you to the staff, pupils and wider community of the schools involved in the pilot, for their time and involvement in shaping this toolkit.

