

# Calderdale #CleanAirSchools Campaign



YEAR 1 REVIEW 2021/22  
Focus on Classroom CO<sub>2</sub>

# Foreword



John Lumb  
Director  
Evotech Air Quality



**In June 2021, on Clean Air Day, Evotech Air Quality launched its #CleanAirSchools campaign to support local schools to monitor and improve their air quality.**

Here at Evotech we believe that children have the right to breathe clean air, just as much as they have the right to drink clean water. In the early days of the Covid-19 pandemic we recognised that schools were having a particularly difficult time trying to manage the transmission of the virus in schools. Scientific evidence was building suggesting the COVID-19 virus was primarily airborne, however, it wasn't until December 2021 that the World Health Organisation confirmed that the virus could spread via aerosols and that the virus was in fact airborne.

As engineers, it made sense to us that airborne transmission was in fact possible, as older buildings tend to be poorly ventilated where stale, exhaled air can easily build up. And, as we spend up to 90 percent of our time indoors, where the air can be up to five times more polluted, we are exposed to a greater risk of virus transmission. In addition to concerns around the pandemic, [research](#) also shows that children are more sensitive to atmospheric pollution as their lungs are still developing, and they breathe higher volumes of air relative to their body weights than adults do.

So, we pledged to support local schools in Calderdale, West Yorkshire, where our head office is based and, on 17 June 2021 we wrote to more than 100 schools asking them to register their interest in our #CleanAirSchools initiative. We selected five schools and offered them a fully funded, zero cost, air quality monitoring programme for the 2021/22 academic year, supported by our local team of engineers and technicians, with the objective of helping their teachers and pupils to see what's in the air they are breathing and to help them find ways to improve it.

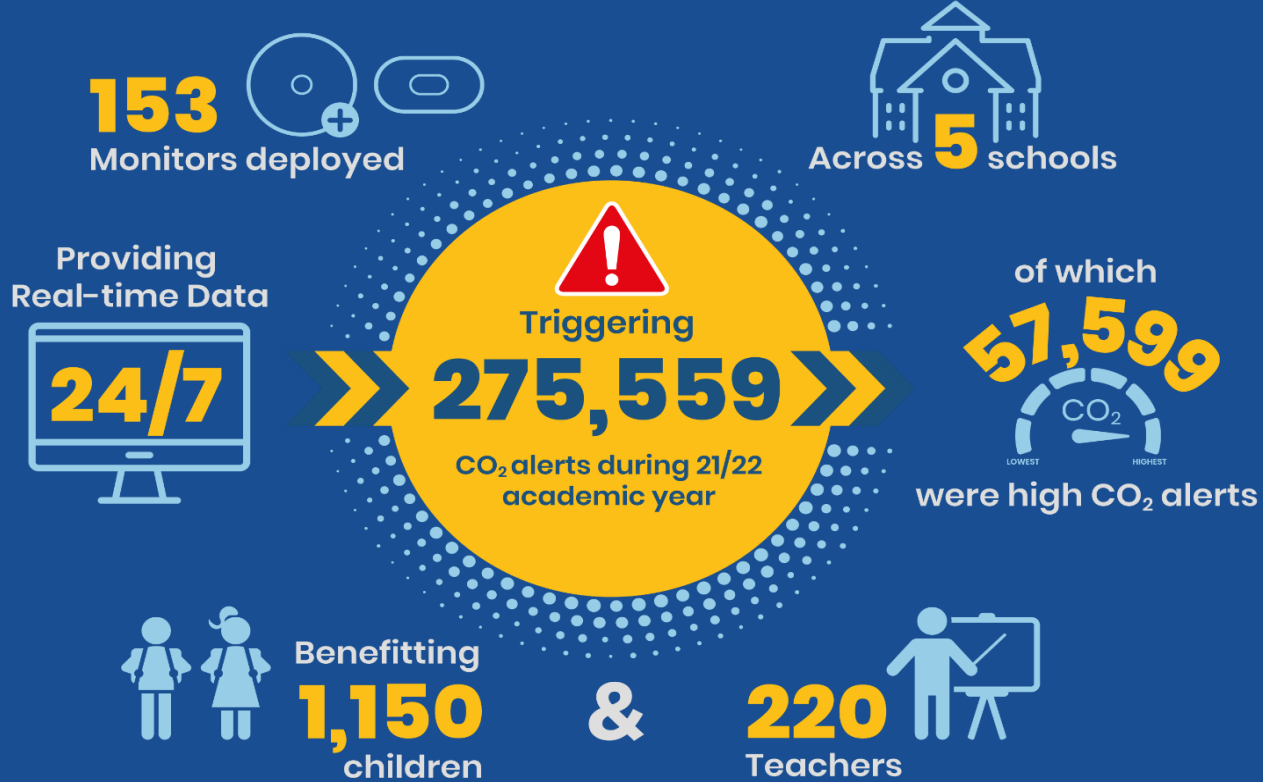
Teaming up with our product partners, Airthings and Airly, we installed state-of-the-art air quality monitoring sensors throughout our chosen five schools during the 2021 summer holidays, and have provided them with educational materials, including interactive white boards, so that pupils can be involved in monitoring the air in their classrooms and to help young people understand more about air pollution.

**One year in, this is a review of actions taken, solutions sought, and learnings made.**

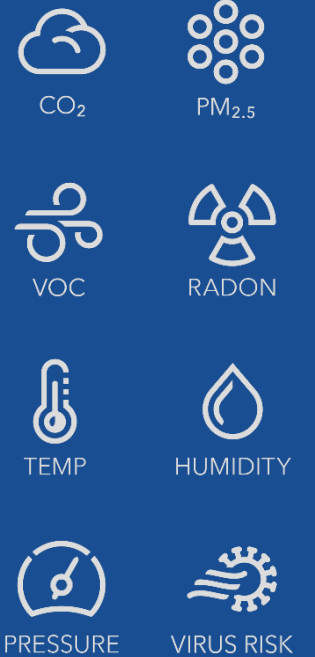
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## #CleanAirSchools in Numbers



### Elements being monitored



“Every child has the right to breathe clean air, whether at home, at school or at play”

## 1. The Air Quality Challenge

The objective of our #CleanAirSchools campaign is to increase awareness in schools about poor air quality and the adverse effects that high levels of CO<sub>2</sub> can have on teacher and pupil health and wellbeing, as well as the impact it can have on their cognitive function and learning outcomes. However, improving air quality in school buildings can be a difficult challenge for many reasons:

### 1. Poor building performance

59% of English state schools were built pre-1980s and by design have limited energy and thermal efficiency, resulting in issues such as over or under heating. Older buildings were traditionally built with natural ventilation where air would pass through air bricks and gaps in the fabric of the building, however, in the quest to become more energy efficient in recent years, schools have been made more airtight, resulting in poorly ventilated spaces.

### 2. High occupancy levels

Most schools have high occupancy levels in their classrooms which can cause CO<sub>2</sub> levels to rise rapidly, resulting in stale air and high virus transmission risks.

### 3. Location

Schools are often located near busy roads with traffic polluting the air in the immediate vicinity of school grounds. This means, that during rush hour at least, it is not advisable to draw in outdoor air by opening windows, as this could allow the ingress of pollutants such as PM<sub>2.5</sub> and NO<sub>2</sub>, further adding to the air quality conundrum the schools have.

### 4. Poor state of repair

According to a 2019 [investigation by the Guardian](#), more than one in six school buildings in England are in urgent need of repair. The newspaper discovered that nearly 4,000 schools needed immediate restoration work. Windows that don't open, or are unsafe to open, prevents teachers from increasing ventilation levels in naturally ventilated buildings.

And, according to the Department for Education (DfE) [Condition of School Buildings Survey](#), published in May 2021, the estimated cost of remedial repairs to the 22,031 state schools, in England alone, will cost £11.4b.

## What we have learned since Covid-19

Early in the pandemic, the Scientific Advisory Group for Emergencies' (SAGE's) Environmental Modelling Group specified that ventilation is a mitigation against the risk of aerosol transmission indoors and, should therefore be considered as part of a hierarchy of risk controls.



Today, as humans, we spend up to 90% of our time in indoor environments, and densely populated, shared spaces such as school classrooms can significantly increase rates of infections and disease when not adequately ventilated.

[Watch the HSE video on ventilation](#)

### Increased risk of virus transmission

Breathing produces a large number of invisible, microscopic particles called aerosols. These particles become suspended indoors and carried around the room on air currents and, when breathed in by other people, can cause virus transmission. Without adequate ventilation these particles will build up indoors making virus transmission increasingly likely if an infectious person is present.

In 2021, [researchers at the Imperial College London](#), monitored CO<sub>2</sub> to indicate how much exhaled breath was present within classrooms, and their models found that seasonal variation in classroom ventilation

levels could lead to airborne infection risks in winter being roughly double those in summer. This highlights that monitoring excess CO<sub>2</sub> can be of significant benefit in mitigating airborne infection risk.

It is not always easy to improve classroom ventilation however, as windows may not open fully, and external pollution and noise can prevent these from being used. Where indoor spaces prove to be poorly ventilated, [research](#) shows that the use of good air cleaning technology and air purifiers that use HEPA filtration can be beneficial, as they have been proven to capture 99.9% of particulate matter, including pollen, mould spores and viruses.

A 10-step guide written by Prof. Mark Mon-Williams and Prof. Catherine Noakes about air cleaning units in schools, is available to download [here](#).

“If the UK’s built environment and public transport systems are not equipped to limit the spread of infections, there will be impacts on individuals, society, and the economy, as illness and poor mental health affect people’s wellbeing and disrupts education and business.”

*Infection resilient environments: time for a major upgrade:  
National Engineering Policy Centre*

## The health effects of CO<sub>2</sub>

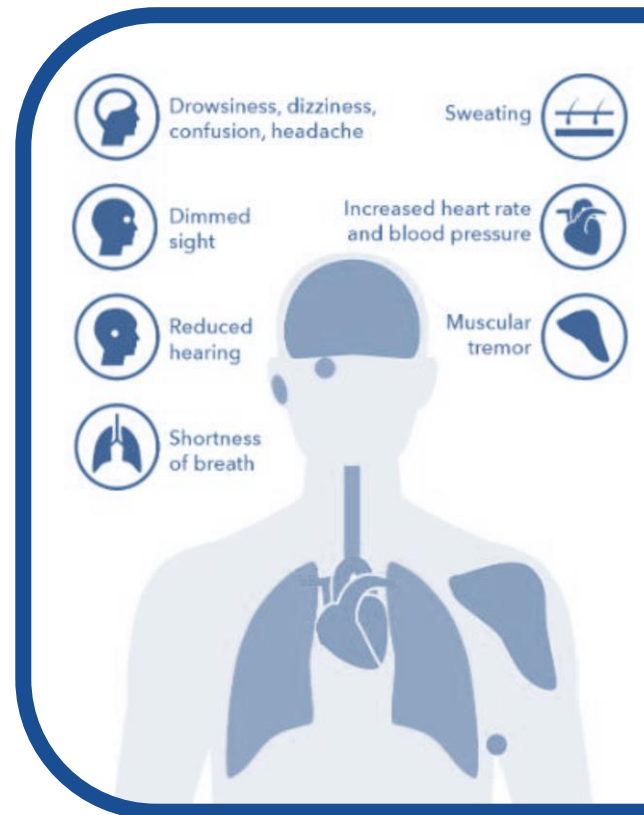
When CO<sub>2</sub> levels are high there is less fresh air, which can cause headaches, restlessness, drowsiness, increased heart rate and blood pressure. High CO<sub>2</sub> levels are also directly correlated to low productivity and increased absenteeism.

### Reduced cognitive function

As well as having serious effects on human health, CO<sub>2</sub> has also been linked to poor cognitive function. In 1904 the Danish physiologist, Christian Bohr, found that increasing CO<sub>2</sub> concentration in the blood reduced the amount of oxygen the blood could carry, resulting in the brain receiving less oxygen, which in turn reduced cognitive function. Named the Bohr effect, it was found to worsen as the body reduced in size, meaning that children are impacted more by high CO<sub>2</sub> concentration than adults.

Improving ventilation can therefore reduce the risk of illness and respiratory symptoms, and studies have shown that it can also improve pupils' concentration, cognitive performance, and productivity, with schools with better ventilated classrooms having higher test scores.

The Danish Technical University undertook a [study in 2020](#) of 92 pupils aged 10-12 years, who over four weeks answered a questionnaire and three different performance tests which measured their processing speed, concentration, logical reasoning, and maths solving abilities. Results showed that by optimising acoustics, light, and indoor air quality, a minimum 10% improvement in educational performance can be achieved, equating to an extra year of education over a period of ten years. In some classrooms, with lower achieving pupils, a 20% improvement in performance was achieved.



*Image courtesy of Airthings*

More recent [research](#) on the relationship between air pollution and cognitive functions in children shows that exposure to nitrogen dioxide is linked to impaired working memory, general cognitive functions, and psychomotor functions; particulate matter (PM<sub>2.5</sub>) has been linked to difficulties in working memory, short-term memory, attention, processing speed, and fine motor function; black carbon, part of fine particulate pollution, is linked to poor verbal intelligence, nonverbal intelligence, and working memory; airborne copper is associated with impaired attentiveness and fine motor skills; and isophorone, a volatile organic compound, has been linked to lower mathematical skills.



## 2. Meet the Schools

Five primary schools in Calderdale, West Yorkshire, selected for their proximity to busy roads, year of construction and method of ventilation, took part in a year-long study of classroom CO<sub>2</sub> levels.

A wide range of indoor and outdoor air quality sensors were installed by our engineers during the 2021 summer school holidays ready to monitor classroom and school wide CO<sub>2</sub> levels during the 2021/22 academic term.



“Helping local schools see what’s in the air they breathe”



The Halifax Academy



Salterhebble Junior School



St Joseph's Primary



West Vale Academy



Holywell Green Primary

# KEY FACTS



STAFF  
**32**

CLASSES  
**7**



AIR QUALITY SENSORS  
21 INDOOR  
1 OUTDOOR

## LOCATION

Portland Road,  
Halifax,  
HX3 6LA



NATURAL  
VENTILATION



CLUBS  
AIR QUALITY MONITORS  
AND WOW SCHOOL



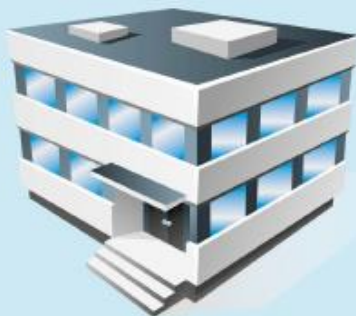
AGE RANGE  
**3-11**

BUILDING YEAR 1862

**183**  
PUPILS

**2**

FLOORS





# KEY FACTS



WEST VALE  
ACADEMY

STAFF

34

CLASSES

8

AGE RANGE

4-11



AIR QUALITY SENSORS

23 INDOOR

1 OUTDOOR



BUILDING YEAR 1879

LOCATION

Stainland Road,  
Greetland,  
HX4 8LS



NATURAL  
VENTILATION



CLUBS  
ECO WARRIORS AND  
WEST VALE WORLD

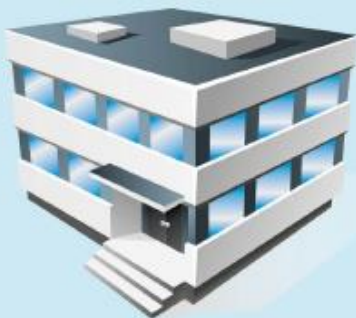


140  
PUPILS



2

FLOORS



English



# KEY FACTS



STAFF  
**35**



CLASSES  
**7**

AIR QUALITY SENSORS  
**23** INDOOR  
**1** OUTDOOR 

## LOCATION

Stafford Square,  
Halifax,  
HX3 0AU



NATURAL VENTILATION



INTERESTING FACT  
SITUATED IN  
AN AQMA\*



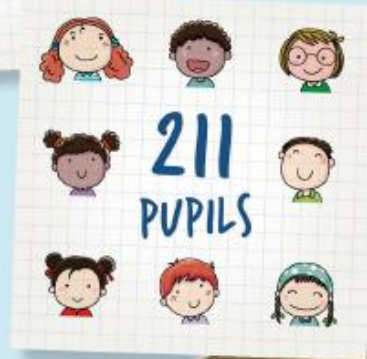
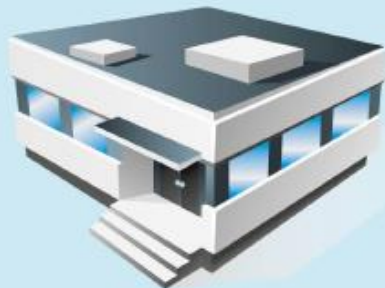
AGE RANGE

**4-11**

BUILDING YEAR **1906**

**1**

FLOOR



\*AQMA = Air Quality Management Area.

# KEY FACTS



STAFF

41

CLASSES

15

AGE RANGE

4-11

AIR QUALITY SENSORS  
30 INDOOR  
1 OUTDOOR

BUILDING YEAR 2015

LOCATION

Spring Hall Lane,  
Halifax,  
HX1 4TW



NATURAL VENTILATION

INTERESTING FACT  
EVOTECH ALSO MONITORS IAQ  
IN THE SECONDARY SCHOOL

210  
PUPILS

2

FLOORS



# KEY FACTS



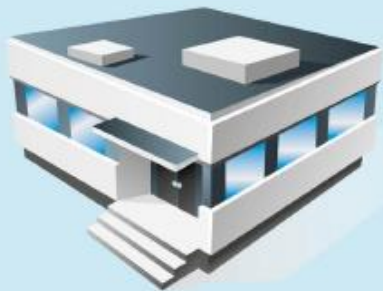
## LOCATION

Stainland Road,  
Holywell Green,  
Halifax,  
HX4 9AE



# 1

FLOOR



### NATURAL VENTILATION



INTERESTING FACT  
HOLYWELL GREEN WAS  
ORIGINALLY TWO SCHOOLS



204  
PUPILS

STAFF

# 41

CLASSES

# 8

AGE RANGE

# 3-11



AIR QUALITY SENSORS

22 INDOOR

1 OUTDOOR

BUILDING YEAR 1915



### 3. Meet the Sensors

The hidden dangers in our classrooms

- CO<sub>2</sub>
- PM<sub>2.5</sub>
- PM<sub>10</sub>
- RADON
- VOC
- TEMP
- HUMIDITY
- VIRUS RISK



AIRTHINGS SPACE PRO



AIRTHINGS SPACE HUB



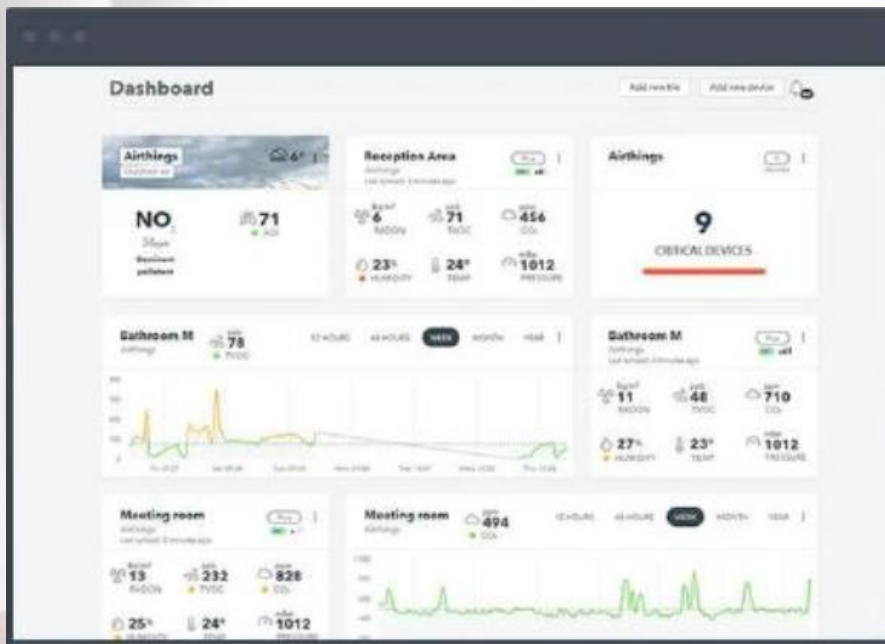
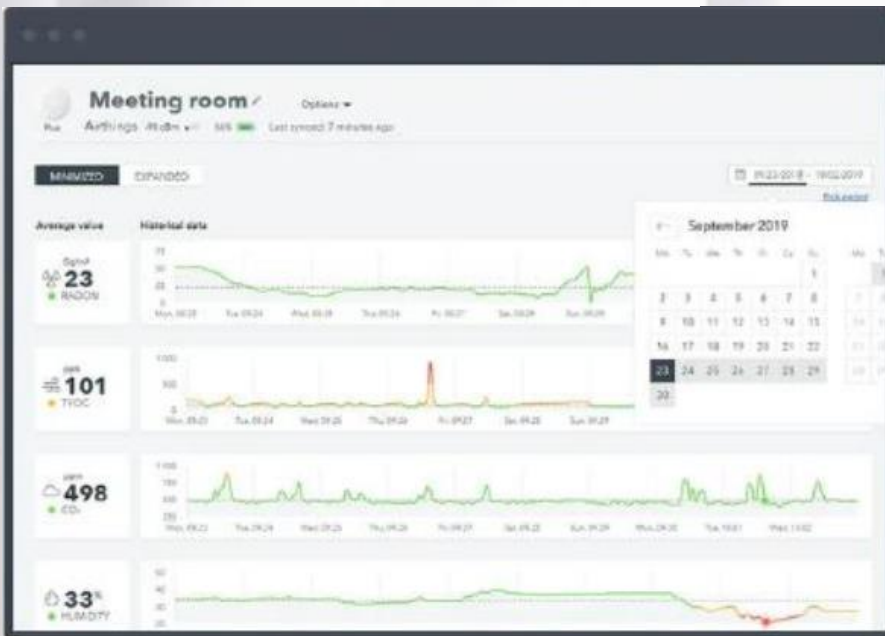
AIRTHINGS SPACE RADON



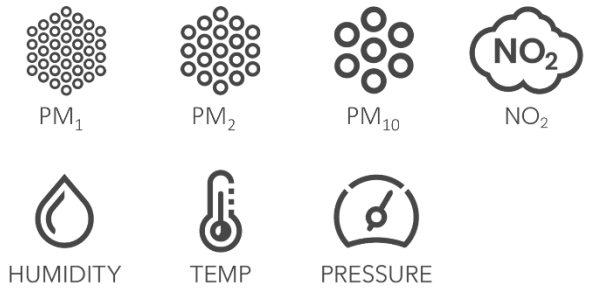
- Wireless sensors
- Real time data
- Standalone connectivity
- Cloud based dashboard
- Secure & encrypted
- Scalable solution

## Real time data and visibility of air quality in all your indoor spaces

Get an overview of all rooms, floors, and locations. Receive automated alerts when conditions change, and monthly reports to provide useful insights.



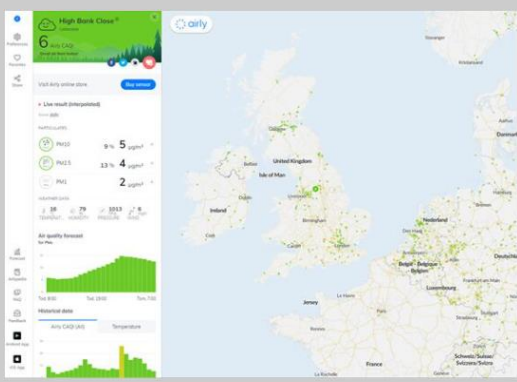
# Monitoring ambient air quality in our playgrounds



## MyAirly – live air quality map & forecasting dashboard

All the most important air quality information in one place. View, monitor and compare sensor data in real-time and get air quality forecasts.

Available to everyone. Free to use.



**Wireless data**  
Wireless connectivity via GSM, Wi-fi and LoRa.



**Low energy**  
Powered by 5v external USB cable. Average consumption 1.2w. Solar power option available.



**Visual Indicator**  
LED light gives visual indication of air quality.



**Weatherproof**  
IP44 stainless steel weatherproof casing.



# Outdoor air quality data at your fingertips

The image displays two digital devices showing the Airly web application interface. The laptop screen shows the 'Impact Tracker' dashboard for Cracow (87) over the last 7 days. Key metrics include 13 more sensors than last year, 35-44 age group for most active members, and a goal of reaching 780,000 people. A table lists the most popular sensors with columns for rank, total clicks, trend, and ID.

Rank	Total clicks	Trend	ID
1.	116 236	13%	5000083
2.	62 247	5%	5003147
3.	32 742	5%	5003147
4.	62 247	5%	5003147
5.	32 742	5%	5003147

The tablet screen shows the 'Report Generator' interface, featuring a line graph of average CAQI results from the last 7 days and a detailed data table for chosen sensors.

Time	PM10	PM2.5	NO2	CO	O3	SO2	
2023-10-15 00:00	15	22	35	32	18	21	28
2023-10-15 01:00	15	22	35	32	18	21	28
2023-10-15 02:00	15	22	35	32	18	21	28
2023-10-15 03:00	15	22	35	32	18	21	28
2023-10-15 04:00	15	22	35	32	18	21	28
2023-10-15 05:00	15	22	35	32	18	21	28
2023-10-15 06:00	15	22	35	32	18	21	28
2023-10-15 07:00	15	22	35	32	18	21	28
2023-10-15 08:00	15	22	35	32	18	21	28
2023-10-15 09:00	15	22	35	32	18	21	28
2023-10-15 10:00	15	22	35	32	18	21	28
2023-10-15 11:00	15	22	35	32	18	21	28
2023-10-15 12:00	15	22	35	32	18	21	28
2023-10-15 13:00	15	22	35	32	18	21	28
2023-10-15 14:00	15	22	35	32	18	21	28
2023-10-15 15:00	15	22	35	32	18	21	28
2023-10-15 16:00	15	22	35	32	18	21	28
2023-10-15 17:00	15	22	35	32	18	21	28
2023-10-15 18:00	15	22	35	32	18	21	28
2023-10-15 19:00	15	22	35	32	18	21	28
2023-10-15 20:00	15	22	35	32	18	21	28
2023-10-15 21:00	15	22	35	32	18	21	28
2023-10-15 22:00	15	22	35	32	18	21	28
2023-10-15 23:00	15	22	35	32	18	21	28





## 4. Classroom CO<sub>2</sub> – The Results

Carbon Dioxide (CO<sub>2</sub>) levels were monitored 24 hours a day, 7 days a week throughout 148 classrooms, libraries, staff rooms and assembly halls, between September 2021 and July 2022.

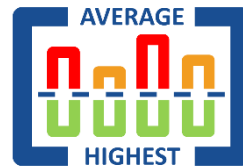
The study was undertaken to see how CO<sub>2</sub> levels increased during peak occupancy times, such as late mornings in classrooms and during school assemblies. The study also looked at how CO<sub>2</sub> levels were affected by the changing seasons throughout the school year.

### Headline results

5,966 PPM



959 PPM



AVERAGE CLASSROOM  
CO<sub>2</sub> READING

4,846 HRS



TOTAL HOURS OVER  
1,500 PPM

57,599

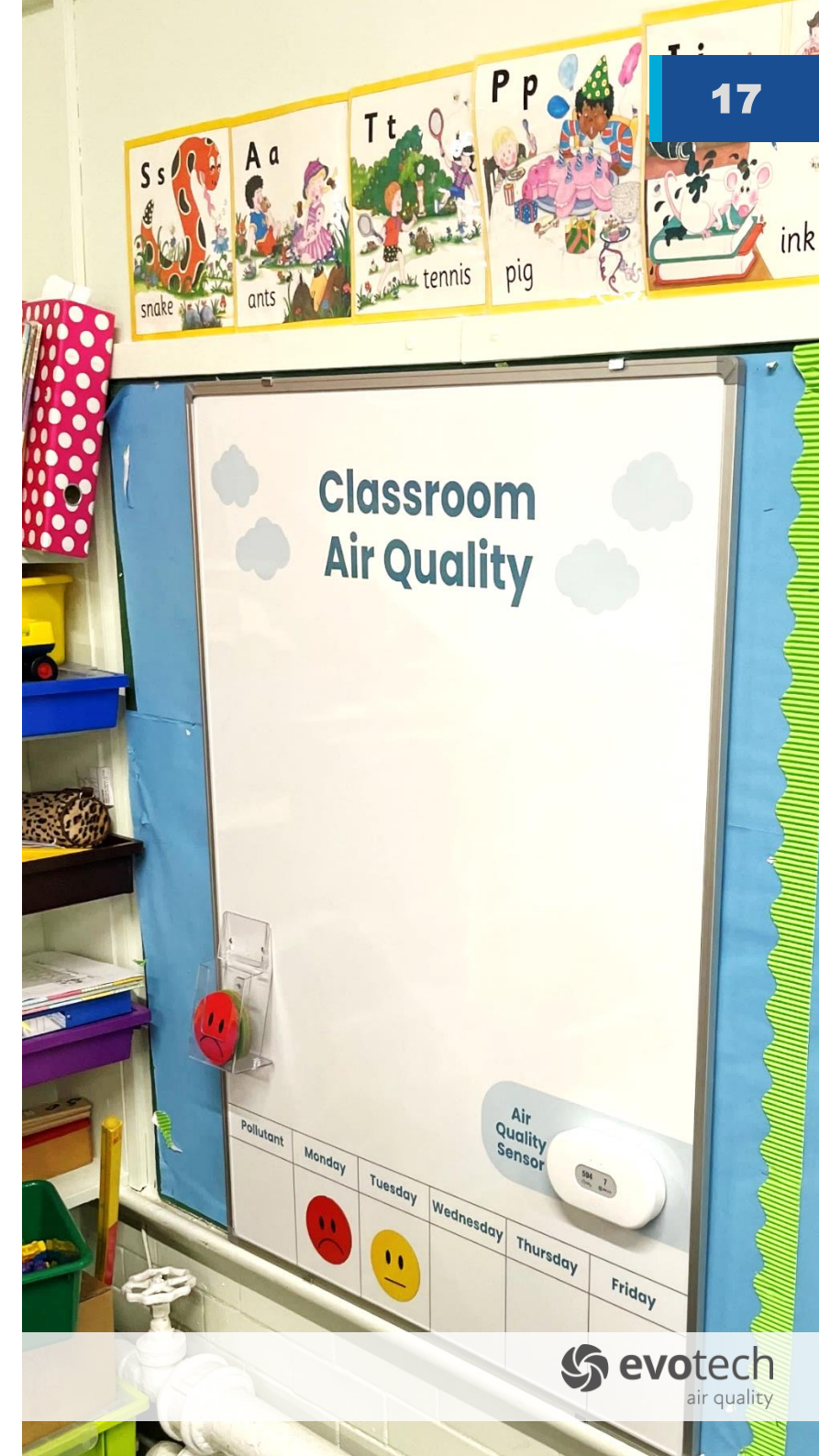


TOTAL CO<sub>2</sub> ALERTS  
OVER 1,500ppm

5.4/10



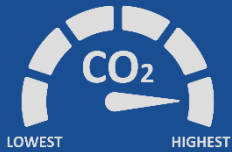
AVERAGE VIRUS  
RISK RATING



## Headline results per school

### SCHOOL #1

**4,287**PPM



HIGHEST CO<sub>2</sub>  
READING

**812**PPM



AVERAGE CLASSROOM  
CO<sub>2</sub> READING

**230**HRS



TOTAL HOURS  
OVER 1,500 PPM

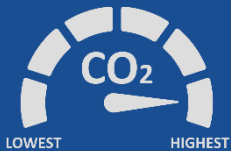
**2,704**



TOTAL HIGH  
CO<sub>2</sub> ALERTS

### SCHOOL #2

**4,240**PPM



HIGHEST CO<sub>2</sub>  
READING

**936**PPM



AVERAGE CLASSROOM  
CO<sub>2</sub> READING

**694**HRS



TOTAL HOURS  
OVER 1,500 PPM

**8,273**

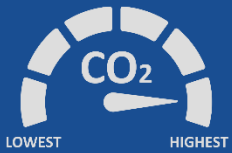


TOTAL HIGH  
CO<sub>2</sub> ALERTS

## Headline results per school cont.

### SCHOOL #3

**3,806**PPM



HIGHEST CO<sub>2</sub>  
READING

**1,005**PPM



AVERAGE CLASSROOM  
CO<sub>2</sub> READING

**770**HRS



TOTAL HOURS  
OVER 1,500 PPM

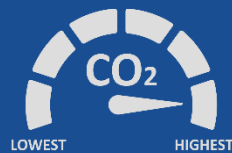
**9,232**



TOTAL HIGH  
CO<sub>2</sub> ALERTS

### SCHOOL #4

**5,966**PPM



HIGHEST CO<sub>2</sub>  
READING

**1,120**PPM



AVERAGE CLASSROOM  
CO<sub>2</sub> READING

**2,830**HRS



TOTAL HOURS  
OVER 1,500 PPM

**33,540**

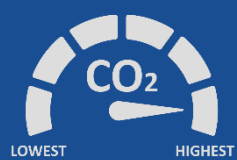


TOTAL HIGH  
CO<sub>2</sub> ALERTS

# Headline results per school cont.

## SCHOOL #5

**3,523PPM**



HIGHEST CO<sub>2</sub> READING

**925PPM**



AVERAGE CLASSROOM CO<sub>2</sub> READING

**322HRS**



TOTAL HOURS OVER 1,500 PPM

**3,850**



TOTAL HIGH CO<sub>2</sub> ALERTS

### The Data

- 9.2million data points/sensor readings analysed
- CO<sub>2</sub> sensor sampling frequency was every 5 minutes
- Data analysed for the period Mon 6 Sep 2021 to Wed 27 July 2022 inclusive
- Data is for classroom hours only and excludes lunchtimes, weekends, and holidays
- Data has been anonymised



# Virus risk ratings



## SCHOOL #1



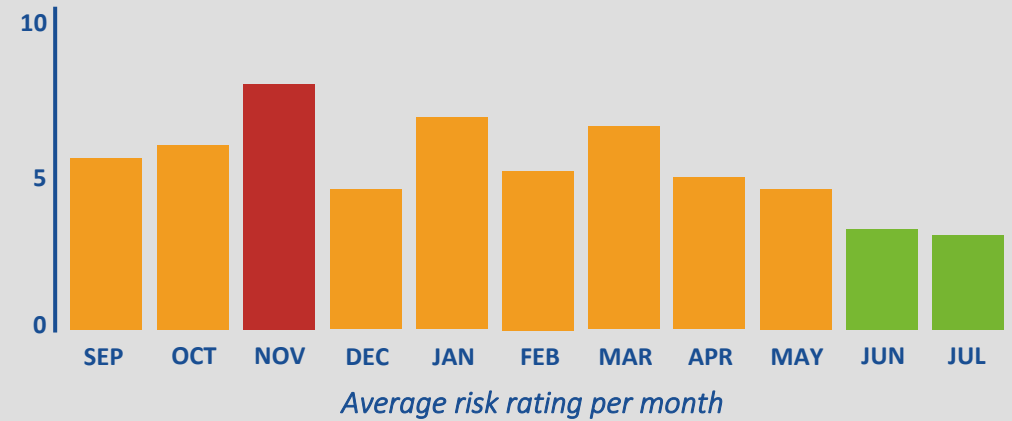
Average risk rating across academic yr.



## SCHOOL #2



Average risk rating across academic yr.

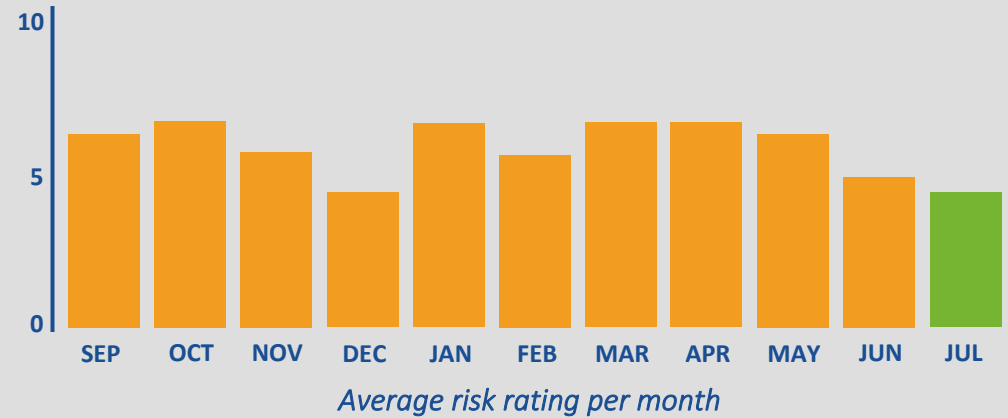




**SCHOOL #3**



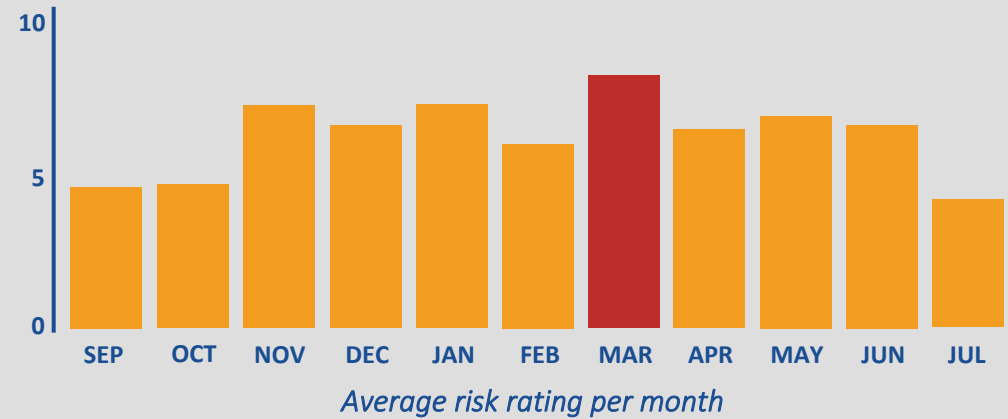
Average risk rating  
across academic yr.



**SCHOOL #4**



Average risk rating  
across academic yr.



## Virus risk ratings cont.

### SCHOOL #5



Average risk rating  
across academic yr.



## How does the virus risk indicator work?

The Airthings virus risk indicator combines data from existing sensors that monitor CO<sub>2</sub>, humidity, and temperature into a proprietary algorithm, to calculate the risk level of virus transmission indoors. It evaluates three risk factors of airborne virus risk to rank the risk out of 10:



1. Virus survival rate (when humidity levels are too low, it means indoor air is dry, which can allow airborne microdroplets and bacteria to stay airborne longer and travel further)
2. The body's natural defence (low humidity levels impair the body's immune system)
3. Room occupancy and ventilation rate (CO<sub>2</sub> levels can indicate that a space is poorly ventilated or over-populated).

## 5. Reducing Classroom CO<sub>2</sub>

### What are safe levels of CO<sub>2</sub>?

Fresh air contains about 350ppm (ppm is parts per million) of CO<sub>2</sub>. Indoor CO<sub>2</sub> levels are acceptable up to around 1000ppm and ideally shouldn't rise above 1500ppm. 2000ppm and above must be avoided, as more serious symptoms like sweating, increased heart rate and difficulty breathing will occur.

CO<sub>2</sub> levels rise and fall regularly indoors and there are many factors affecting CO<sub>2</sub> levels including ventilation, number of people, and length of time in an enclosed space.

### The Effects of CO<sub>2</sub> on Health & Wellbeing

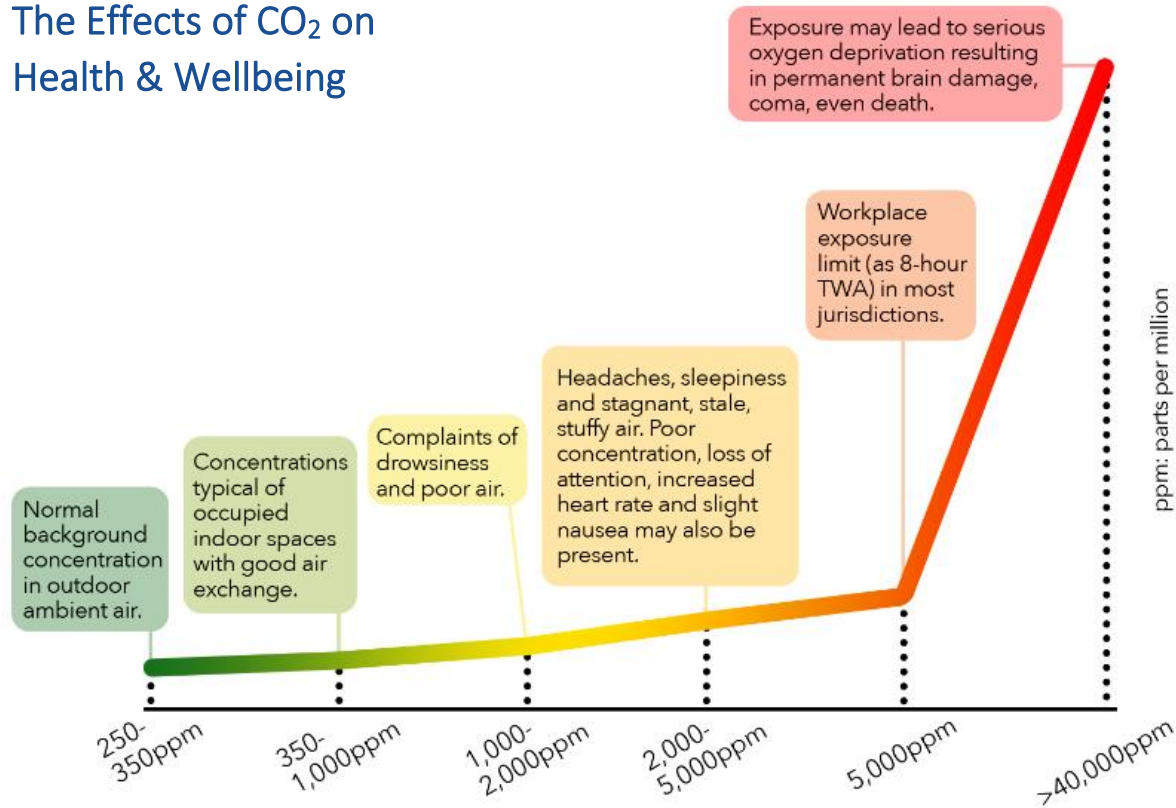


Image courtesy of Airthings





## How to reduce classroom CO<sub>2</sub>



Reduce occupancy levels



Reduce amount of time spent in enclosed, poorly ventilated spaces



Improve ventilation:

- in naturally ventilated buildings – open windows & doors
- in mechanically ventilated buildings – check and replace filters, check duct work is ok, check and adjust control settings and fan speeds

If possible, monitor your classroom CO<sub>2</sub> levels

	<b>Good</b> less than 800ppm	RELAX
	<b>Climbing</b> 800 - 1500ppm	OPEN WINDOWS
	<b>High</b> over 1500ppm	TAKE ACTION!

ppm means parts per million

AIRTHINGS SPACE  
CO<sub>2</sub> SENSOR



## Outdoor air is not (always) fresh air

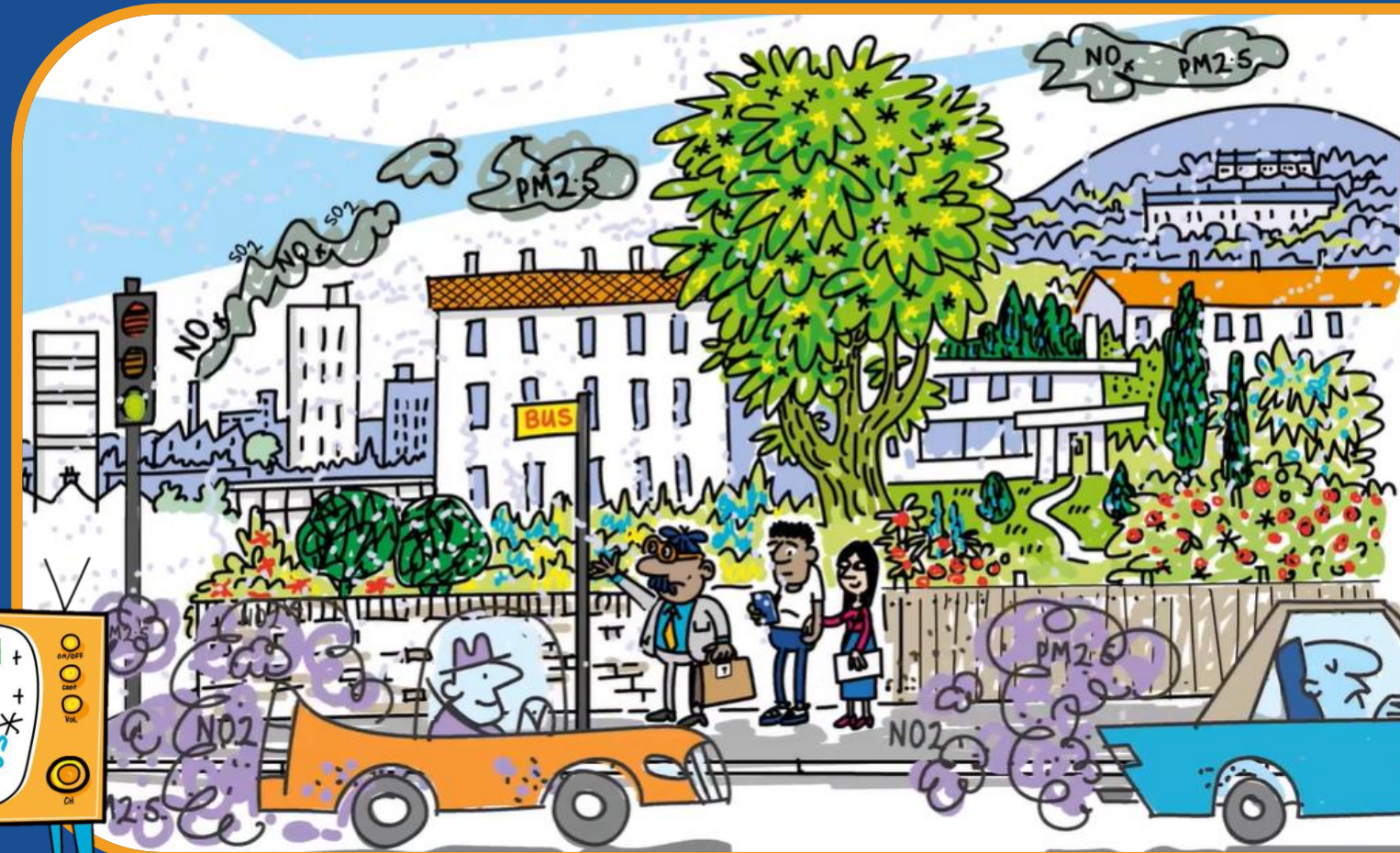
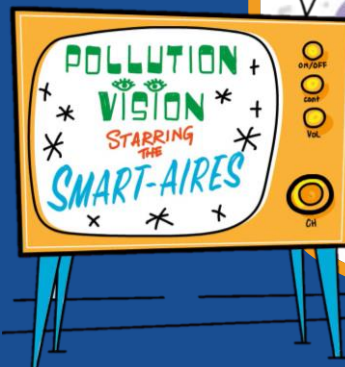
It is important to recognise that outdoor air is not always clean and fresh. Always consider outdoor conditions when opening doors and windows, for example:

- Proximity to busy roads and vehicle pollution
- Sources of outdoor air pollution such as factories, farming, construction, and wood burners
- Increased levels of airborne organic matter in periods of prolonged dry warm weather
- Outdoor CO<sub>2</sub> levels can also be higher in built up areas such as towns and cities

If possible, monitor the outdoor air quality in your playground



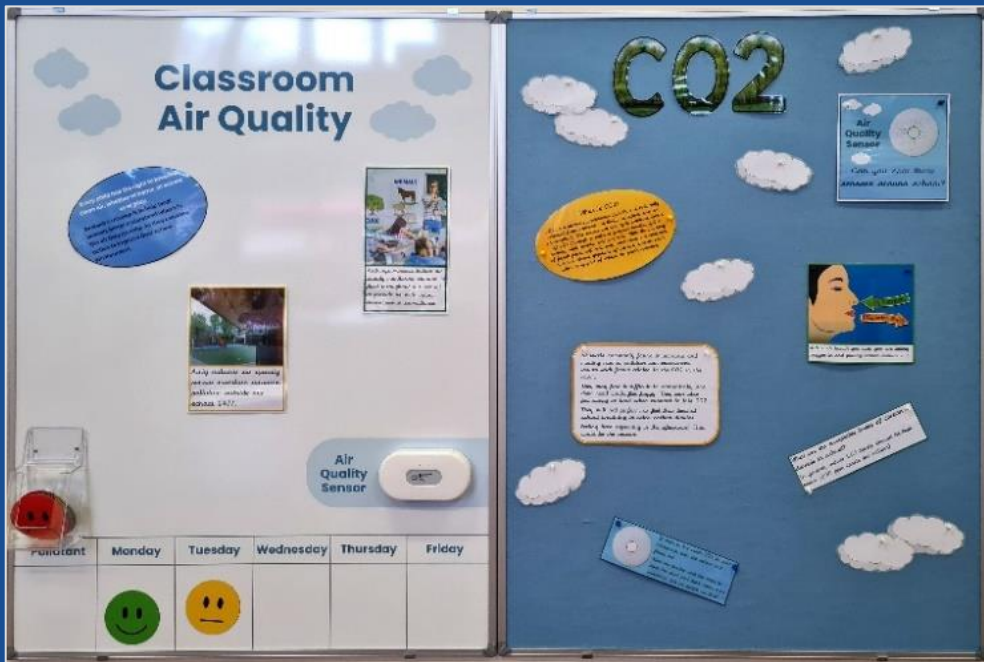
WATCH OUR ANIMATED VIDEO ABOUT AIR QUALITY



# 6. Improving Awareness

Improving awareness of air pollution, so that our schoolchildren can better understand what's in the air they breathe and how it can affect their health, is a vital part of improving our school environments.

Therefore, working with our five Calderdale #CleanAirSchools, we created an interactive Classroom Air Quality whiteboard, designed to create a focal point in classrooms and bring to life the subject of CO2. Using the integrated Airthings air quality monitor, the children track their classroom CO2 levels in real time and record these over the school week using magnetic emoji faces.



We also designed a range of posters for use in schools to help support learning about CO2 and what can be done to reduce it.

DOWNLOAD OUR FREE CO<sub>2</sub> POSTER

## CARBON DIOXIDE

FROM THE TEAM AT **evotech** air quality  
www.evotechairquality.co.uk  
#cleanairschools

**What is it?**  
Carbon Dioxide or CO<sub>2</sub> is a natural gas that we breathe out around 24,000 times a day. It is harmless unless levels rise above 1,000 ppm. It can make you feel sleepy and make it difficult to concentrate.

**WHERE does it come from?**  
Indoor CO<sub>2</sub> is a combination of CO<sub>2</sub> made by breathing and CO<sub>2</sub> from outdoors. Outdoor CO<sub>2</sub> comes from burning wood, coal, oil and natural gas.

**HOW is it measured?**  
We can't see or taste CO<sub>2</sub>, so we use CO<sub>2</sub> sensors to detect it. The Airthings monitor CO<sub>2</sub> in your school. They provide accurate readings at all times of the day and night.

**WHO is affected and how?**  
High levels = low productivity in schools, offices and homes. High levels of CO<sub>2</sub> cause:  
• Restlessness • Increased heart rate and blood pressure  
• Drowsiness • Headaches  
• Sweating

**CO<sub>2</sub> Levels:**  
 Good (less than 800ppm) RELAX  
 Climbing (800-1000ppm) OPEN WINDOWS  
 High (over 1500ppm) TAKE ACTION!  
ppm means parts per million

DOWNLOAD OUR FREE TOP TIPS POSTER

## TOP TIPS to help you control CO<sub>2</sub> in your classroom

FROM THE TEAM AT **evotech** air quality  
www.evotechairquality.co.uk  
#cleanairschools

**TIP 1**  
Check your classroom air quality monitor often. Use the table below and if CO<sub>2</sub> levels are climbing or high, ask your teacher to open some windows and doors.

**TIP 2**  
CO<sub>2</sub> levels are highest just before break or lunchtime. Before you leave your classroom open all windows and doors to clear the room of CO<sub>2</sub>, while the room is empty.

**TIP 3**  
Opening windows and doors on opposite sides of your classroom brings in more outdoor air.




**TIP 4**  
Open windows in corridors and leave your classroom door open to help outdoor air flow through.

**DO NOT FORGET TO ASK YOUR TEACHER FOR PERMISSION TO OPEN BOOKS AND WINDOWS!**

**CO<sub>2</sub> - where does it come from?**  
1. People 2. Burning fossil fuels 3. Deforestation  
ppm means parts per million

## Free Resources

A free to use library of resources for schools has also been developed on our #CleanAirSchools [webpage](#), that includes research, educational materials, presentations and quizzes, from a wide variety of sources including the UK Government, charities, media, and leading industry experts.

<p><b>Booklets/Videos/Infographics</b></p> <p><b>CARBON DIOXIDE AND COGNITIVE PERFORMANCE</b></p> <p>Heightened carbon dioxide levels are known to result in poorer student test performance.</p> <p>2,500 Classroom CO<sub>2</sub> levels at 2500 ppm had much worse test scores than at 1000 ppm.</p> <p>A 400 ppm increase in indoor CO<sub>2</sub> levels has been associated with a 21% decrease in performance on a cognitive test.</p>  <p>Learn about outdoor air, pollution, indoor air and all the tiny things that make up the air we breathe every day.</p> <p><a href="#">Learn more</a></p>	<p><b>Quizzes</b></p>  <p>Test your knowledge with fun and engaging quizzes.</p> <p><a href="#">Learn more</a></p>	<p><b>Links</b></p>  <p>Charities, support groups and educational bodies who are providing schools with help and advice.</p> <p><a href="#">Learn more</a></p>
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CLICK ON THE LINKS ABOVE TO DOWNLOAD OUR FREE RESOURCES

Infographics

Booklets

Outdoor  
air quality

Videos

and lots more

The logo for AIR FOR KIDS, with 'AIR' in a large, bold, blue font, 'FOR' in a smaller, blue font, and 'KIDS' in a large, bold, blue font. The text is contained within a white rectangular box.

# AIR FOR KIDS

## Interactive learning for kids

Games

Quizzes

Puzzles

A yellow rounded rectangular button with the text 'Access Air for Kids' in white.

Access Air for Kids

The AIRTHINGS logo, featuring a white triangle inside a blue circle.

Powered by AIRTHINGS

## 7. #CleanAirSchools Year Two

### What is Particulate Matter?

Particulate Matter, or PM, isn't just one contaminant or pollutant. It's a range of particles of dust, dirt and liquids that become suspended in the air.

Some of these are large enough to see, like smoke, smog, or soot, but the most harmful are smaller, invisible particles. They can get into your lungs and even your bloodstream.

The healthier the air, the fewer PMs.



PM<sub>1</sub>



PM<sub>2.5</sub>



PM<sub>10</sub>

We're not done yet, as CO<sub>2</sub> is only part of the problem!

The Evotech team continue to work with our five Calderdale schools and together, during Year Two (September 2022 to July 2023), our focus is on Particulate Matter (PM), a serious air pollutant that can be inhaled deep into the lungs where it can cross into the bloodstream and cause serious health problems.

The data is already showing some trends of high PM levels and, as four of our five #CleanAirSchools are in old buildings with natural ventilation, and within close proximity to busy roads, opening doors and windows is not necessarily the best solution.

Our Year Two Review will therefore focus on Classroom PM<sub>2.5</sub>, its sources, effects on health and wellbeing, what the data is telling us and possible solutions.

Thank you to all the schools, staff and pupils for taking part in our Calderdale #CleanAirSchools Campaign, and for the ongoing support from our partners Airthings and Airly.



[www.evotechairquality.co.uk](http://www.evotechairquality.co.uk)

If you're interested in monitoring the air quality in your school, please contact the Evotech Air Quality team on 0333 207 4245 or email us at [info@evotechairquality.co.uk](mailto:info@evotechairquality.co.uk)



# Solutions to help you transform your indoor air quality



Indoor air quality sensors



Outdoor air quality sensors



Air cleaning technology



Specialist testing and inspection



Building ventilation



Air filtration solutions



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 **evotech**  
air quality