

April 2020

# Air Quality Monitoring Project Monitor Kit

## KIT CONTENTS

- 1 Nova PM Sensor Type SD011
- 1 Humidity and Temperature Sensor
- 1 Type ESP8266 Processing Module
- Female-Female Connectors
- Plastics Tubing
- Cable Ties
- Junction box housing/own housing



## To be provided by school

- Suitable housing, there are a number of suggestions for this but this could be part of a design-and-make project. A junction-box housing can be provided as a suitable suggestion for housing which needs minor modifications.
- Power supply and USB connector

## What is the Luftdaten project?

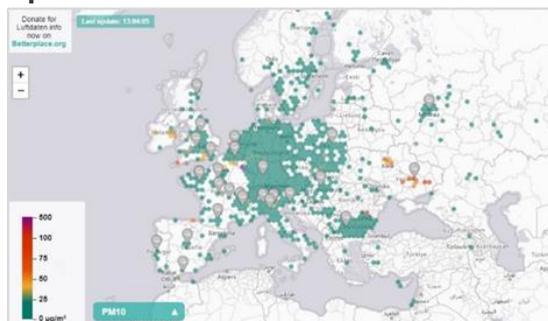
The Luftdaten project is a network of thousands of ordinary citizens around the world who have installed self-built air quality monitors outside their homes or workplaces. The sensors take regular readings throughout the day which feed into the open data [Luftdaten air quality map](#) generating a continuously updated global particular matter map from the transmitted data.

Our aim is to increase the number of sensors in and around Leicestershire to build up a better picture the of air quality across our county and add to the UK monitoring network.

The effects of the current COVID 19 lockdown on air quality can be seen clearly by comparing the map in April 2020 to one from November 2019.

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November 2019



As well as contributing to the global map each monitor also produces graphs of the changing particulate levels over the course of 24 hours.

## Why does air quality matter?

We all need clean air. On average, a person inhales around 14,000 litres of air every day. When the air we breathe is of poor quality it can affect our health. The UK [Government](#) recently announced stricter regulations regarding particulate emissions due to health concerns with a call for action for local authorities to plan for measures to improve air quality.

Particulate matter is a collective term for solid and liquid particles suspended in the air and small enough to be inhaled. They come from human activities such as burning of fuels for home heating, industrial processes and vehicle exhausts (particularly diesel) as well as natural sources such as wind-blown dust, pollen and volcanic eruptions and vary in structure and chemical composition depending on where they come from. These airborne particles are tiny – too small for the human eye to see but can cause health problems from nasal tract irritations to respiratory and cardiac disease and even premature death. When poor air quality affects our health it also affects our economy due to increasing medical costs and lost productivity when people are unable to work and some air pollutants settle on land and waterways or wash into them, which can affect these environments.

## Building a sensor

These components are intended to build an Air Quality Monitor as detailed by Luftdaten. Build instructions are detailed on their website. <https://luftdaten.info/en/construction-manual/#komponenten-schaltung>. There are some variations with our components with those on the website. More detailed instructions will be provided with the kit and help can be given by e-mailing [Kathryn.kroon@leics-ebc.org.uk](mailto:Kathryn.kroon@leics-ebc.org.uk)

The kits can be used in schools as part of a wide range of STEM activities for STEM clubs, CREST Awards and design and make projects and cross curricular work.

We hope to link teachers with STEM Ambassadors where appropriate to help the school maximise the potential of these monitors and support the technical aspects of the projects.

We must thank **James Taylor**, our STEM Ambassador who has been hugely influential in initiating this project and STEM Learning who have provided the funding to expand this work

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## Project Ideas

There are a numerous ways in which the monitors can be incorporated into learning and ambassadors can work with teachers in the best way to utilise this resource in their school. Some useful websites detailing initiatives and resources have been included below but Leicester City Council's Air Quality Education website contains some excellent lesson ideas.

<https://schools.leicester.gov.uk/services/environment-health-and-well-being/air-quality-education/> Contact [Danielle.Kennell@leicester.gov.uk](mailto:Danielle.Kennell@leicester.gov.uk) at Leicester Council

- KS2/3/4/STEM club project - The data can be used as part of a STEM Club/CREST project investigating a number of factors associated with clean air e.g. effect of location, weather, etc. Students can already look at data locally and across the world and see the effects when countries come out of lockdown. At KS3 students could redesign the housing for the components and at KS4 able students may also be able to build the sensor itself with support.
- Data from the monitor could be used cross curricula in other subjects such as Maths and Geography or in assemblies.
- At KS5 it could be an extended design and build or research project at KS5 for a Gold Crest Project or EPQ – The basic design could be modified to increase accuracy or a mobile version could be designed to monitor air quality at different locations or on a cycle ride or walk.

## Useful Websites

Leicester Air Quality Action Plan

<https://www.leicester.gov.uk/media/180653/air-quality-action-plan.pdf>

Contact [Danielle.Kennell@leicester.gov.uk](mailto:Danielle.Kennell@leicester.gov.uk) at Leicester Council

Clean air day

<https://schools.leicester.gov.uk/services/environment-health-and-well-being/air-quality-education/clean-air-day/>

Greenpeace

<https://www.eco-schools.org.uk/wp-content/uploads/2016/11/Air-Pollution-Teachers-Pack.pdf>

Healthy Air – Clean Air 4 Schools Toolkit (originally developed for London but can be applied to your area.) KS1&2

[https://www.london.gov.uk/sites/default/files/ca4s\\_toolkit.pdf](https://www.london.gov.uk/sites/default/files/ca4s_toolkit.pdf)

Aberdeen Project

<https://www.airaberdeen.org/background/>

Air Apparent – Bristol Project

<https://airapparentuk.wordpress.com/air-pollution/>

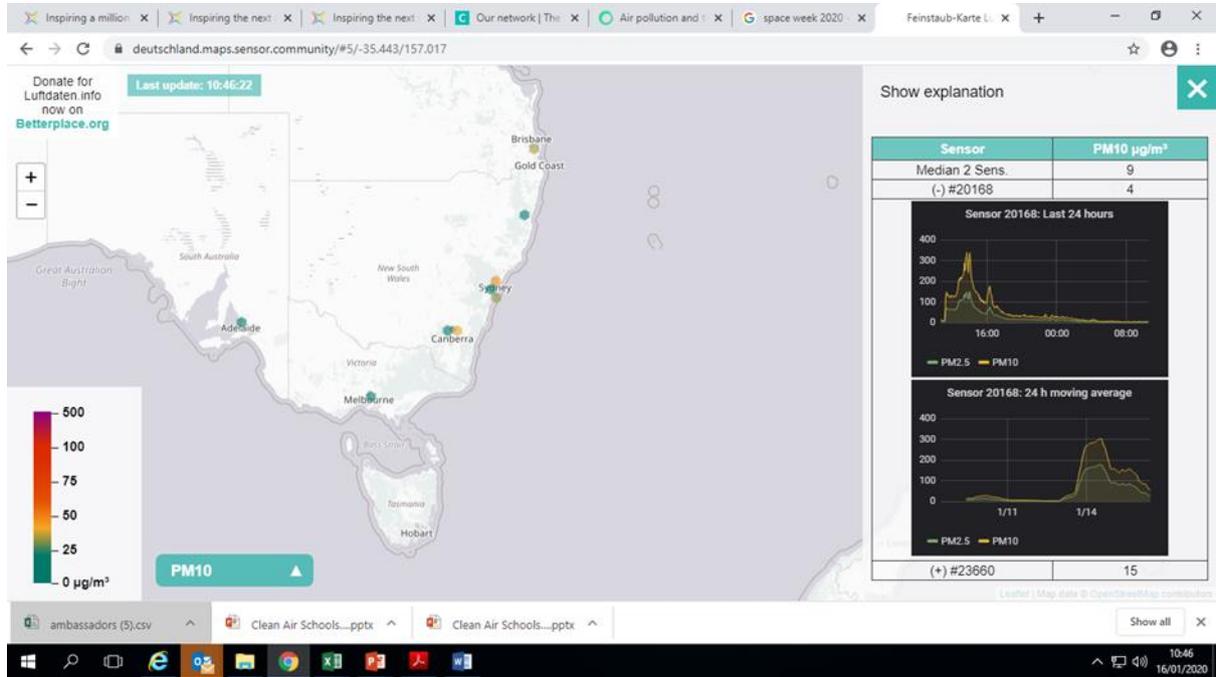
Guardian Article

<https://www.theguardian.com/environment/2017/sep/01/uk-citizens-are-taking-air-pollution-monitoring-into-their-own-hands>

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## Interesting Recent Events

### 1. Monitoring the impact of fires in Sydney 16/01/2020



### 2. Detecting the Sandstorm in Tenerife 24/02/2020

