## National Curriculum links

## **KS3 Science:** Analysis and evaluation, interpreting observations and data, including identifying patterns and using observations. Earth and atmosphere: the production of carbon dioxide by human activity and the impact on climate

## **KS4 AQA** **Chemistry**: 4.9.2.2 Human activities which contribute to an increase in greenhouse gases in the atmosphere, 4.9.2.4 - The carbon footprint and its reduction

## **KS4 OCR** **Chemistry**: Organic chemistry C6.3d, e

## **KS4 Edexcel:** Earth and atmosphere science 8.24, 8.25

## *Lesson Aim*

* To understand how we monitor air quality in Leicester

## Lesson objectives

Students will learn:

## To plot line graph data

## To identify trends in data and potential anomalies

## To evaluate reliability of data

## Key vocabulary

Pollution, nitrogen dioxide, fine particulates, Automatic Urban and Rural Network (AURN) station, mean

## Resources required

## PowerPoint presentation, Excel spreadsheet or printed data sheets, Leicester air quality action plan (AQAP)

## Differentiation / expectations

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| --- | --- |
| **Most pupils will** | **Some pupils will** |
| Understand how air quality is monitored  Evaluate data on nitrogen dioxide  Plot data on particulate data (PM10) | Justify the differences in nitrogen dioxide levels  Evaluate data trends based on evidence presented |

## Introduction

This lesson gives students the opportunity to use real data from air quality monitoring equipment in Leicester. Background information is provided about why and how we monitor air quality, followed by handling data to create graphs (via Excel or hand drawn graphs) data is then compared between annual and 24 hour mean data.

## Group / Class activity

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| **Timings** | **Activities** | **Notes / resources** |
| 2 minutes | **Slides 1-2**  Introduction to learning objectives and outcomes of the session |  |
| 10 minutes | **Slides 3-8**  Why we monitor air quality, how we monitor air quality (using AURN data), where does nitrogen dioxide come from and what is the trend of nitrogen dioxide  Activity: students to discuss questions on slide 10 (trends in data, why there are differences) |  |
| 20 mins  0r 10 mins (Excel) | **Slides 11-12**  Activity: students to plot particulate data PM10 (annual) either using data sheet and graph paper or via excel spreadsheet. Graphing will obviously take a lot longer than Excel. |  |
| 20 minutes  Or 10 mins (Excel) | **Slides 14-15**  Activity: students to plot particulate data PM10 (24 hour mean) – this concept might need to be explained (highest concentration in a 24 hour period)  Discuss why the data shows different outcomes (annual is decreasing, mean is more varied – why might this be? High peaks from one off vehicles etc.) |  |
| 5 minutes | **Review what you have discussed about data presentation** |  |

## Extension/homework

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| **Activities** | **Notes / resources** |
| **Slide 16**   * Using your data, write a letter to your local MPs and/or councillors to describe what you have found out and what people should do * Design a campaign which could be used in school to raise awareness of the issues * Use the AURN website to look at data trends in similar cities to Leicester, do they have similar patters or different? <https://data.gov.uk> |  |