Well done to all the schools that participated in the GLOBE Air Quality Campaign

The NO_2 Numbers

The concentration of NO_2 captured in your diffusion tubes was analysed by a laboratory. The laboratory then applied a correction to express this concentration in terms of a cubic metre. Each result represents an **average** NO_2 concentration, expressed in micrograms (µg) per cubic metre of air (m^3), that was captured over a 4-week period at your school.

What Do the Results Mean?

The results reflect the average NO_2 level at that measuring location for a short period of time, simply a snapshot of ambient NO_2 pollution levels in the air. The results do not capture hourly or daily lows and highs, but they do indicate a general level of NO_2 pollution for the period. It is now becoming apparent that there is no safe level of pollution, with long term exposure of low to medium levels of NO_2 being associated with harmful health impacts.

A nitrogen dioxide concentration scale is shown below, the scale may be useful for you when examining the link between NO_2 concentration and health. The World Health Organisation (WHO) has issued new (2021) guidelines for NO_2 concentration in terms of health, the current WHO guideline value of 10 µg/m^3(annual mean) was set to protect the public from the harmful health effects associated with this pollutant gas.
The current EU guideline value is 40 µg/m^3(annual mean), however this value is now under review to reflect growing research….(see here EU Guidelines to be revised)

It is important to remember that NO_2 is just one part of determining overall air quality. There are other air pollutants that can seriously affect our health, such as, particulate matter (pm), ozone (O_3) and sulphur dioxide (SO_2).

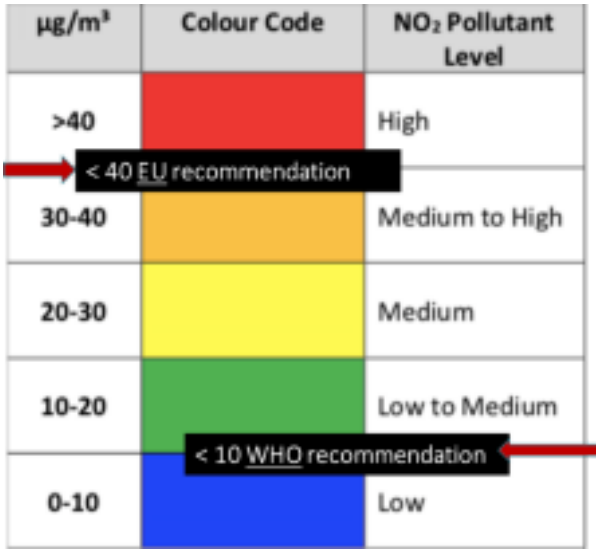

Figure 1. A colour coded NO_2 concentration scale

Fig 2. 2021 WHO Air Quality Guidelines

What happens next?

It's data analysis time! Look at the NO_2 results from your school. Were the results consistent with what you expected, or did something surprise you?

Here are some ideas for analysing your results:

- If this is not your first time measuring NO_2, you could compare your results from a previous campaign! Has anything changed? Why?
- Compare your results to EPA's monitoring station readings here: https://airquality.ie/. Is there a monitoring station near you?

There are factors to consider when looking at your NO_2 measurements, such as the local traffic density, the built environment, and local weather conditions at the time of data collection.

Traffic

NO_2 is a traffic-related pollutant so there is little surprise that the local traffic volumes and the proximity to major roads play a significant role in observed NO_2 concentrations. Did you collect traffic volume data around your school? You can also look up traffic counts on some of Ireland's bigger roads on the Traffic Infrastructure Ireland page. What did you observe when analysing your data?

Ventilation

The low ventilation of a street also contributes to increased concentrations of NO_2. The narrower the street, the less impact the wind has, making exhaust gases swirl more slowly to higher air layers. If you are in a city or town, you could look at the streets around the school and see if any have this profile (streets with low ventilation and heavy traffic are sometimes referred as street canyons).

Weather

There are several factors that can influence the distribution of pollutants in the air, primarily wind speed and wind direction. Prevailing winds can have an influence on the movement of atmospheric pollutants. On a large scale, think about the movement of the ash cloud from an Icelandic volcano in 2010! Rain can also have an impact, as some pollutants are removed from the atmosphere and fall as acidic rain on to the Earth's surface. Check out Met Eireann for historic monthly/daily weather statements that you can use when analysing the weather conditions at the time of your measurements.