# Assessing pollution levels

***Education in Chemistry***January 2020
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In this worksheet you will calculate the levels of NO2 in the air by considering factors such as road types, proximity to roads and yearly trends

**NITROGEN DIOXIDE DIFFUSION TUBE READINGS - DUDLEY BOROUGH 2010 (NO₂ in µg/m3)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Address** | **Road type** | **Siting category** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct**  | **Nov**  | **Dec** |
| Amblecote Primary | Residential | Background | n/a | 32.59 | 24.27 | 21.43 | 15.10 | 11.72 | 12.49 | n/a  | 26.43 | 18.23 | 24.62 | n/a |
| Christ Church Primary | Residential | Background | 37.78 | 35.94 | 23.07 | 21.24 | 18.80 | 18.60 | 12.90 | n/a | 18.90 | 22.71 | 40.55 | n/a |
| Clent View | Residential | Background | 26.72 | 29.49 | 21.44 | 15.54 | 10.74 | 11.61 | 7.63 | 10.75 | 11.65 | 15.06 | 26.77 | 28.56 |
| Halesowen Road | A | Roadside | 69.2 | 63.2 | 61.9 | 52.4 | 48.8 | 44.9 | 34.0 | 41.6 | 52.2 | 48.5 | 54.3 | 64.5 |
| Town Centre | A | Roadside | 59.7 | 51.6 | 53.0 | 47.5 | 49.5 | 45.2 | 33.4 | 35.7 | 44.8 | 43.4 | 53.7 | 53.1 |
| Hall Street, Dudley | B | Roadside | 66.3 | 64.3 | 60.9 | 49.1 | 43.8 | 42.7 | 29.4 | 37.6 | 44.3 | 42.7 | 47.7 | 59.4 |
| Northfield Rd Primary | B | Background | 38.33 | 37.70 | 11.37 | n/a | n/a | 16.30 | 14.42 | 16.72 | 30.10 | n/a | 33.89 | n/a |
| Quarry Bank Primary | B | Roadside | 45.66 | 40.70 | 33.92 | 27.93 | 25.31 | 22.70 | 19.70 | 23.23 | 29.86 | 24.74 | 30.02 | 39.30 |
| Redhall Primary, Zoar St | B | Background | 30.38 | 24.82 | 21.64 | 19.00 | 13.07 | 12.54 | 11.38 | 14.90 | 17.71 | 20.94 | 30.57 | n/a |
| Zoar Street | B | Roadside | 48.70 | 44.67 | 39.48 | 34.23 | 32.34 | 29.37 | 22.36 | 27.40 | 33.87 | 28.50 | 40.09 | 44.25 |

The European Union has asked the UK to measure levels of nitrogen dioxide in the air. Where levels are greater than 40 µg/m3action is required to reduce pollution.

Questions

1. Calculating means and ranges
	1. Calculate the mean level of nitrogen dioxide (NO2) for the months of January, February and March.
	2. Calculate the ranges for the levels of NO2 for the months of January, February and March.
2. The European Union has asked the UK to measure levels of NO2 in the air. Where levels are greater than 40 µg/m3 action is required to reduce pollution.
	1. On your data set, highlight measurements above 40 µg/m3.
	2. Discuss any trends.
3. Comparing how the type of road affects the minimum and maximum levels of NO2 measured
	1. What type of street registered the lowest level of NO2?
	2. What type of street registered the highest level of NO2?
	3. Suggest why these types of streets had a big difference in levels of NO2.
4. Comparing trends across the year
	1. Which month registered the lowest level of NO2?
	2. Which month registered the highest level of NO2?
	3. Describe and explain the seasonal trends in the data.
5. Considering the effect of proximity to the roadside

Two diffusion tubes were placed in different locations on Zoar Street.

* 1. Evaluate the data for the two locations and choose a way to represent it graphically.
	2. Describe and explain the trends seen.