Assessing pollution levels

Education in Chemistry
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In this worksheet you will calculate the levels of NO_2 in the air by considering factors such as road types, proximity to roads and yearly trends

NITROGEN DIOXIDE DIFFUSION TUBE READINGS - DUDLEY BOROUGH 2010 (NO_2 in µg/m^3)

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
    a. Calculate the mean level of nitrogen dioxide (NO_2) for the months of January, February and March.
    b. Calculate the ranges for the levels of NO_2 for the months of January, February and March.

2. The European Union has asked the UK to measure levels of NO_2 in the air. Where levels are greater than 40 µg/m^3 action is required to reduce pollution.
    a. On your data set, highlight measurements above 40 µg/m^3.
    b. Discuss any trends.

3. Comparing how the type of road affects the minimum and maximum levels of NO_2 measured
    a. What type of street registered the lowest level of NO_2?
    b. What type of street registered the highest level of NO_2?
    c. Suggest why these types of streets had a big difference in levels of NO_2.

4. Comparing trends across the year
    a. Which month registered the lowest level of NO_2?
    b. Which month registered the highest level of NO_2?
    c. 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.
    a. Evaluate the data for the two locations and choose a way to represent it graphically.
    b. Describe and explain the trends seen.