An Investigation into Nitrogen Dioxide Concentration

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Introduction

Knowing the Nitrogen Dioxide(NO_2) concentration in your area is quite important. If the concentration of Nitrogen Dioxide is high it can lead to photochemical smog which is created when UV sunlight reacts with the Nitrogen Dioxide and other Nitrogen Oxides(NOx).

The issue with smog in our environment is that it can have severe impacts on human health. Over time breathing in the air around such smog can cause respiratory problems. Nitrogen Dioxide inflames the lining of the lungs which can result in more frequent lung infections and reduced immunity.

It is important that the local community of an area know the amount of Nitrogen Dioxide concentration in order that they grow aware and maybe start driving less and walking more or using a bicycle. Also, it is important for people to know in the event they may have any medical problems such as asthma and lung diseases - as it can affect their health. Persons with cardiovascular diseases also suffer from similar air pollution issues.

Research Question(s)

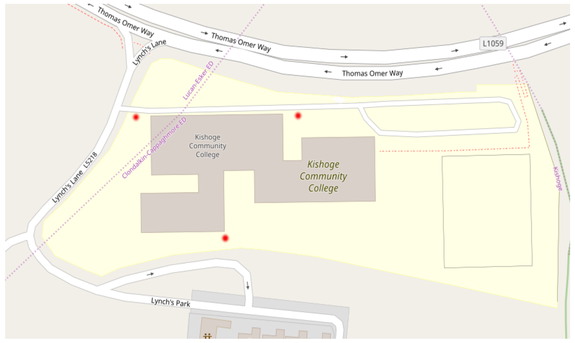
At Kishoge Community College we considered the following: What the actual NO_2 levels in the locality were? Did we at Kishoge Community College believe there was a NO2 problem in the area? We also thought about questions such as whether our NO2 measurements were 'normal' (average) and would we be surprised? How did our local environment compare with schools in similar locations in suburban areas?

Due to the fact that these measurements were taken over only a brief period - we questioned the validity as compared with an annual logging. Would the NO2 measurements obtained be constant throughout the year or differ greatly?

Research Methods

Safety and security were considered when deciding upon the optimal positions for installing the NO2 monitoring tubes.
Three different locations on the school campus were selected. One at the student drop off zone. Another at the main road exposure - so that we could measure the levels of nitrogen dioxide from passing cars and trucks. The remaining monitoring tube was located near an industrial building site adjacent to the school front gate. In total we had three tubes distributed throughout our school campus.

Map of our school campus



The picture above is a map of our school campus. The red dots indicate the locations of the NO2 monitoring tubes.

Results

Our Results were Average in all areas.

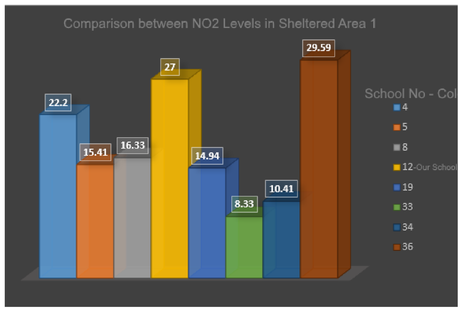
Sheltered Area = 27

Drop Off Point (Moving Traffic) = 27.15

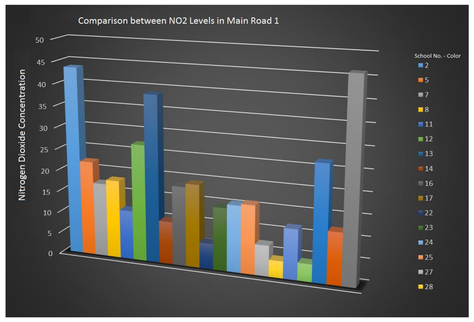
Main Road Exposure = 28.38

Results Table:

NO2 concentration (µg/m3)	Description
50 +	Extremely bad
45 - 50	Very bad
40 to 45	Bad
35 - 40	Substandard
30 - 35	Mediocre
25 - 30	Average
20 - 25	Pretty good
15 to 20	Good
10 to 15	Very good
0-10	Excellent



A graph that shows comparison between our school(Number 12) and other schools in suburban areas.



A graph that shows comparison between our school(Number 12) and other schools in Ireland.

Discussion

The results were quite surprising. We resulted in average in all areas from 27 to 29 on Nitrogen Concentration. We expected higher concentration near the road exposure and moving traffic. We suspected higher concentration due to the fact that a lot of vehicles drive by every day. Next time when measuring nitrogen dioxide concentration we could if possibly place the NO2 Tubes closer to the road to get a more accurate result. In comparison with other schools we believe the reason for our results being average and those of other schools being lower is possibly due to, as mentioned before, the large amount of vehicles that go by on a day to day basis across the road.

Conclusions

- The results were encouraging with NO2 levels being less than expected given the volume of traffic in the local area and passing by our school daily.
- As the test period was such a short time further research over an extended period would be advisable in order to determine the true NO2 levels locally.

Bibliography

globe.gov Website
Australian Department of Environment

Air quality Campaign Ireland 2019