



Air Quality in different areas around our school

Air quality and the level of air pollution are important factors and have significant impacts on the health and wellbeing of humans. It is now considered that any level of air pollution is not acceptable and poses a risk. High levels of nitrogen dioxide cause harm to the human respiratory tract and increase a person's vulnerability to, and the severity of, respiratory infections and asthma. Long-term exposure to high levels of nitrogen dioxide can cause chronic lung disease and are carcinogenic. People with asthma, as well as children and the elderly are generally at a greater risk.

There are often wide variations in local air quality that go undetected and so our school decided to investigate the quality of the air around our school. Gozo College Secondary School is situated in the smaller island of Gozo where there is relatively less traffic than in Malta. However, there still is a substantial number per capita.

This investigation was a collaboration project between the Gozo College Secondary, St Michael's School in Malta and a school in Ireland to compare data. Three diffusion tubes were used to measure the amount of nitrogen dioxide in the air. Daily readings of air quality and atmospheric conditions were taken for four weeks, excluding weekends. The diffusion tubes were then collected and sent for analysis to a laboratory in Hampshire.



Figure 1 Launching of the Globe Air Quality Campaign and setting up of diffusion tubes

Temperature and atmospheric conditions were taken on a regular basis during every school day between 12th October, and 9th November, 2021. Atmospheric and temperature readings were also taken over a four-week period to support the results of the average nitrogen dioxide levels. These were taken from the site of the third tube, namely the school playgrounds and the turf and race track ground. Cloud observations were also made using the GLOBE Observer App, measuring air pressure, air temperature, humidity and surface temperature.

When the results of the diffusion tubes came back from the laboratories in the UK, on comparison, nitrogen dioxide levels were higher in Malta than in Gozo, as expected. This is so due to heavier traffic concentration of cars per capita and demographic density in Malta, than in Gozo. Within the school, the highest level of nitrogen dioxide was collected from the parking

entrance, as school staff together with staff from neighbouring offices and other people who do their shopping at a nearby shopping complex park there. Additionally, buses and parents' cars are mostly left on standby while waiting for students to board and/or alight thus maximising nitrogen dioxide emissions. These emissions potentially cause damage to the respiratory tract and chronic lung disease besides deteriorating the air quality and the surrounding environment.

The data collected helped to determine whether there are nitrogen dioxide emissions in the air around the school area and their intensity. The higher the nitrogen dioxide level, the poorer the air quality (Ashawa 2017).

It resulted that the traffic count record together with the fact that buses and private car engines are left running while waiting for students to board and alight both contribute to the rise of the level of nitrogen dioxide in the surrounding environment.

Conclusion

As expected the NO₂ levels were highest at the entrance of the school parking even though not as high as in Malta. The fact that the school in Malta had higher levels than the one in Ireland underlines the fact that the surroundings do play an important part in the level of NO₂. This is particularly true as Ireland, which is such a big country has still got levels comparable to the Gozo school and even less than the Malta school. This is probable to the fact that the Irish school is in the countryside as compared to the busy and heavily built area in Malta.

Through this research the students and the school community together with Ramsgrange Community School in Ireland are now aware of the effect of nitrogen dioxide. In addition to taking measurements at school, discussions about the results took place between the participating students of the schools locally and in Ireland. What followed were recommendations to the school leadership team and the Victoria/Rabat Local Council. The findings were also shared with the rest of the school by means of a poster in different levels of the school premises.

Following this the students came up with an action plan for change. Further actions discussed were:

- Car pooling
- Car-free days
- Incentive for students to use alternative transport e.g. bikes, walking (school transport is free and already in place) and to use public transport when commuting to other places (this is also free to post secondary students and youths).
- Parents asked not to drive students to school.
- Signposts (EkoSkola) in entrance – not to leave cars, (also buses) idle as lots of exhaust is emitted.
- The availability in the community of free bikes with trackers for commuting from one place to another (Gozo).
- Bike lanes.
- Bike rack in school garage.
- More indigenous trees in Victoria and around Gozo and Malta in general.
- Raise awareness amongst the local community and authorities as regards to better traffic management and choice of mode of transport.

Through these actions one can get closer to reaching SDG 11 (Sustainable cities and communities) and SDG 12 (Responsible Consumption and production).



Figure2 Explaining and setting up of diffusion tubes.



Figure 3 Student Haley Xuereb taking surface temperature.



Figure Students from participating schools sharing and discussing results.

Location of Diffusion Tube	µg/m ³
Main Entrance School	19.02
Entrance to Parking	20.56
Ground Area	12.78

Table 1 NO₂ levels at Gozo College Secondary School

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