



Highly Commended

Science Writing

Year 3-4

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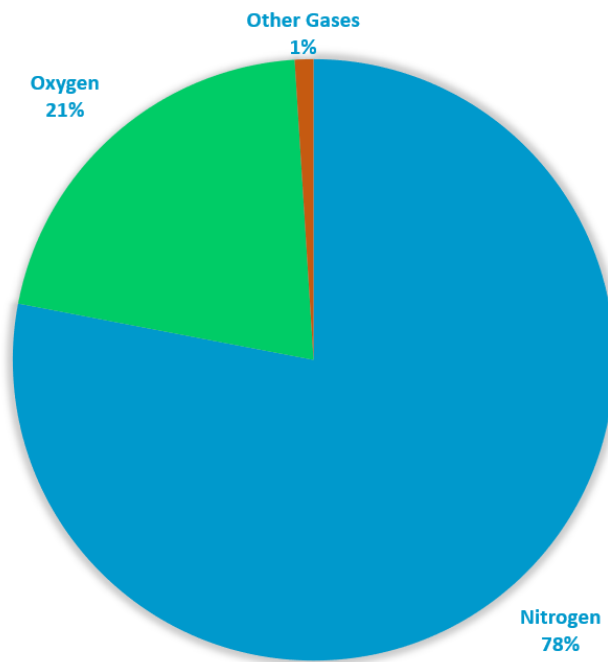
St Andrew's School



Air Quality

What is Air?

Air is a mixture of gases that forms the Earth's atmosphere. Most living things need air to survive. Air is invisible but can often be felt when it moves. It is made up of 78% nitrogen and 21% oxygen, with the remaining 1% consisting of other gases, plus dust, moisture, pollutants, plant spores and bacteria.



Composition of Air

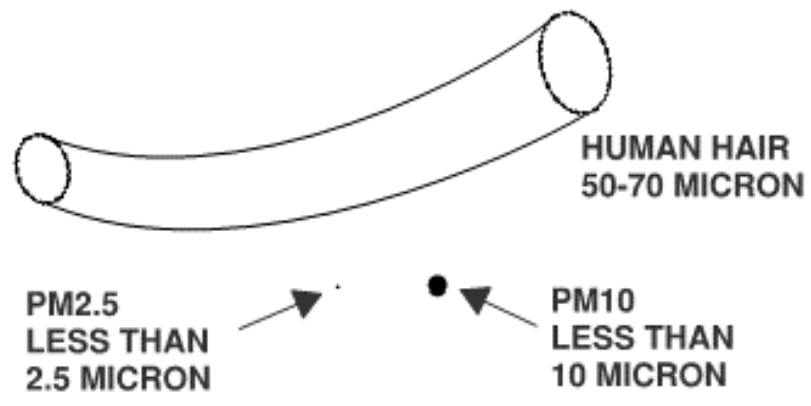
What is Air Quality?

Air quality is a measurement of how clean or polluted air is. We use Air Quality Index (AQI) as an indicator of air quality by measuring pollutants in the air and comparing the results against a scale. The higher the AQI, the more dangerous the air is to human.

| AQI | 0 - 33 | 34 - 66 | 67 - 99 | 100 - 149 | 150 or higher |
|----------------------|-----------|---------|---------|-----------|---------------|
| Level of Air Quality | Very Good | Good | Fair | Poor | Very Poor |

Air Quality Index (AQI) Scale used in Australia

The pollutants measured are particulate matter (PM2.5 and PM10), carbon monoxide, nitrogen dioxide and ozone. PM2.5 and PM10 are measurements of airborne particulate matter with diameter of 2.5 microns or less and 10 microns or less respectively. Particles that fall under these categories, especially PM2.5, can cause adverse health effects when they are inhaled and enter deep into our lungs.



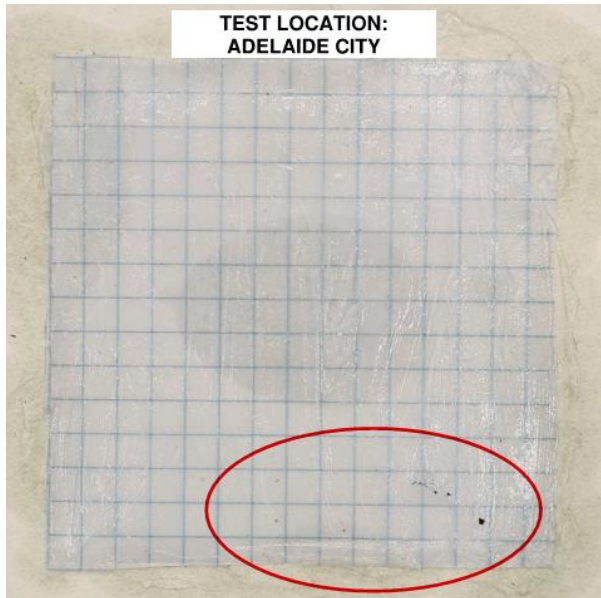
Particulate Matter Size Comparison

Air Pollution

Air pollution means poor air quality and it occurs when our air is contaminated with harmful level of gases or particles. The cause of air pollution can be due to human activities or through natural disasters such as volcanoes.

Many industrial activities, large power plants and vehicles burn fossil fuels in order to operate. This produces greenhouse gases such as carbon dioxide, carbon monoxide and sulphur dioxide. Farming activities and wastes in landfill produce methane, which also contributes to the greenhouse gases. High level of greenhouse gases in our atmosphere will eventually lead to climate change.

A simple experiment was carried out to test the air quality in the city area and suburban area. The aim is to capture particles in the air. Petroleum jelly was applied on a grid paper attached to a cardboard and was then exposed to the air for one hour. The more particles captured on the petroleum jelly layer indicates a worse air quality. As expected, the air quality in the city is worse, as the city has more vehicles.



Air Quality Experiment

Use of chlorofluorocarbons (CFC) in spray cans and refrigerants also affects air quality, and it causes large holes in ozone layer. Fortunately, the use of CFC has now been largely banned around the world.

Anything that emits smoke, soot or dust including forest fires and open burning will also affect air quality.

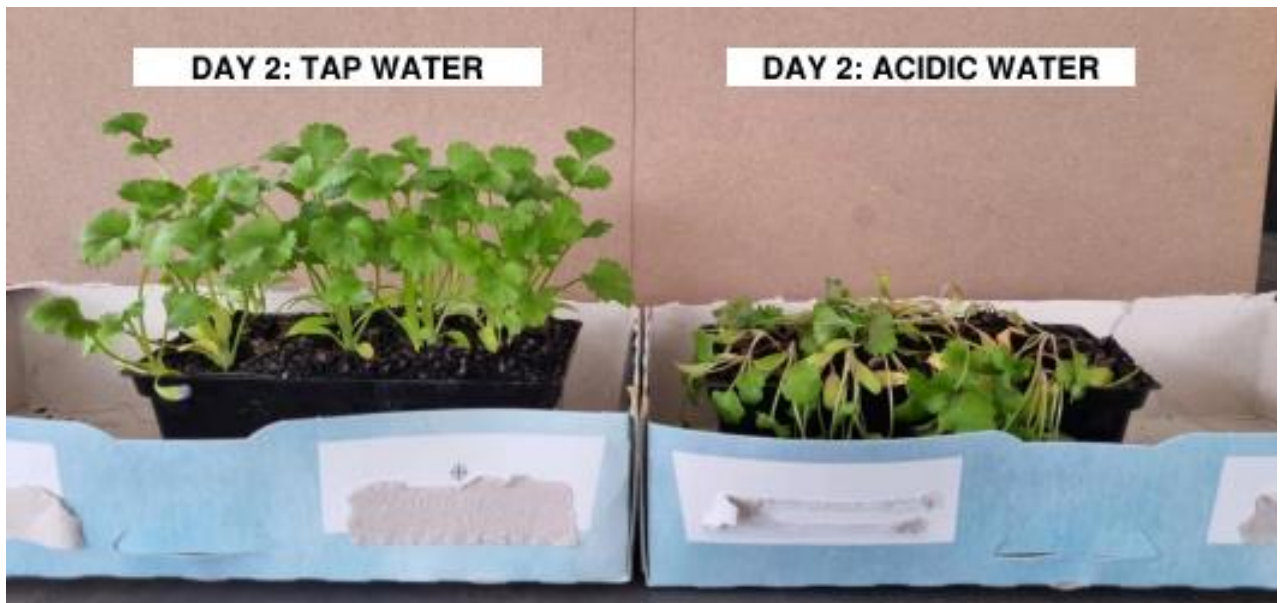
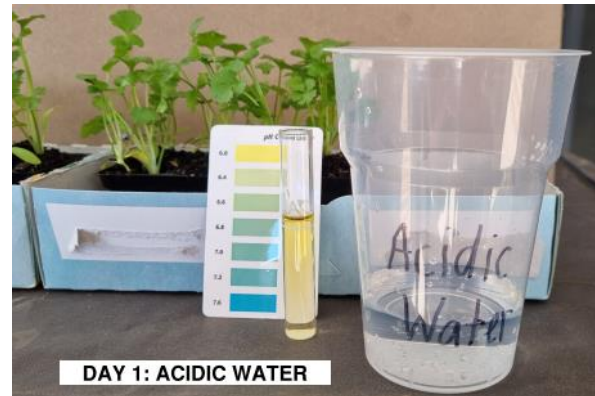
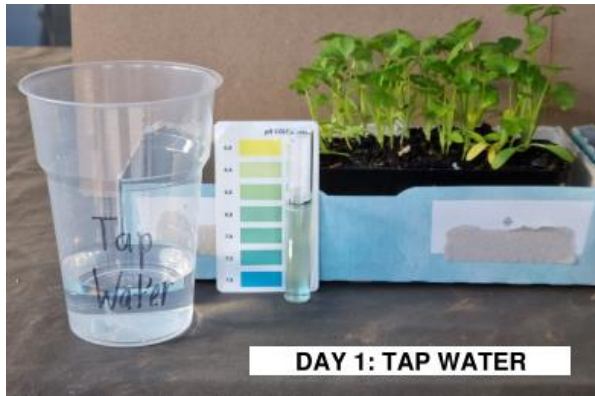
The Effects of Poor Air Quality

Poor air quality affects our health and many other living things. Nitrogen dioxide and sulphur dioxide can damage our lung tissue when inhaled for a long time. Poor air quality can also cause eye irritation, skin disorders and affect our cardiovascular system.

When our climate changes due to greenhouse gases, the earth starts to experience poor weather conditions and extreme temperatures.

Poor air quality also leads to acid rain. Nitrogen dioxide and sulphur dioxide when mixed with water in the air gives carbonic acid. When the rain is acidic, it is very harmful to living things. Harmful gases in the air can even cause ocean acidification when these gases dissolve into the ocean, leading to coral bleaching and disruption to sea ecosystem.

An experiment was carried out to check the impact of acid rain on living things. Two pots of similar coriander plants were used. One plant was watered with normal tap water and the other with vinegar mixture to represent acid rain. The results are as expected where the pot watered with tap water thrives, while the other plant watered with vinegar mixture was badly affected.



Acid Rain Experiment

How Can We Improve Air Quality?

Many things can be done to improve air quality. This includes simple everyday activities such as turning off lights when not in use, less heating by wearing thicker clothing and use energy efficient lighting such as LED to reduce energy use. The less energy is used the less the power plants will have to burn fossil fuels to produce energy. We can also use renewable energy sources such as solar and wind power.

We should use unleaded fuels only because lead is very toxic to our body, and enforce use of catalytic converters in vehicles to filter the harmful gases from vehicles and convert the gases to less harmful ones. We can also share vehicles to reduce the number of vehicles in use.

We can plant more plants, which are natural air filters through the photosynthesis process, to get rid of harmful pollutants in the air.



Photosynthesis

Conclusion

Good air quality is something vital to Earth. We need to stop polluting and start caring for our planet for a better and healthier future!

(Word count: 793 words)

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