SONAIRTE OPEN AIR PROJECT

A BREATH OF FRESH AIR FOR OUR COMMUNITY

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Based in Laytown, Co Meath, Sonairte, recipient of the John Shelley Bursary, is an environmental charity established in 1988. The Sonairte Open Air Project is an educational initiative that provides outdoor air quality monitors to schools in East Leinster. The air quality sensors as well as teaching resources are provided to give students a hands-on learning experience about air quality, the factors that influence its status and how it affects both human and environmental health. The sensors provide live data that is globally accessible through online platforms. The primary objective of the project is to raise awareness about air quality and how we can improve air quality in Ireland for the wellbeing of our communities.

What is Sonairte?

Sonairte (pronounced son-art-a) is an environmental charity that operates an Ecology Visitor Centre and Gardens in Laytown Co Meath. The centre is open to the public and serves as a real world, practical demonstration of how we can all live and thrive sustainably in partnership with nature. The word Sonairte comes from a middle Irish word meaning 'positive strength', encapsulating our dedication to encouraging growth within the community through environmentally conscious education and practices.

Established as a charity in 1988 by volunteers from the local area and passionate environmentalists, Sonairte has developed into a hub of environmentally focused activities. Its primary objective is to improve awareness about environmental problems and provide viable solutions to address these issues.

The 10-acre community space includes a 2-acre walled garden dating to the 18th century. The garden is certified organic and provides a wide range of fresh fruit and vegetables to our vegan cafe, eco-shop, and local markets. The nature trail along the scenic River Nanny provides a tranquil setting to reconnect with nature.

The bee museum educates visitors on the vital role bees play in our ecosystem, and the second-hand shop is a goldmine of clothes, books, and other household items, promoting reusing and recycling.

There are also several community spaces, including the yoga room which provides a serene space for mindfulness and wellness practices, and the long hall is a multifaceted venue available for community events.

Sonairte presents a large array of educational events and workshops during the year. These include horticulture workshops, upcycling sessions, beekeeping courses, mindfulness workshops, arts and crafts sessions and much more. Community events also take place. Examples include seasonal markets which allow local creatives to sell their products and arts festivals like Cruinniú na nÓg, in collaboration with the Droichead Arts Centre, create a vibrant atmosphere of fun and learning for all ages.

Sonairte's mission is to be a community hub that empowers people to live more sustainably, addressing the serious environmental crises of biodiversity loss and climate change. We aim to be an educational center that protects and enhances understanding of the natural world, providing the public and schools with the knowledge and tools needed to conserve it.

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Sonairte Open Air Project

In line with Sonairte's main values, we have begun the Sonairte Open Air Project, which is designed to provide an educational platform and further our understanding of air quality within our community. This project, made possible by the generous support of the John Shelley Bursary, launched in early 2024, marks a significant step towards creating a healthier environment for all.

In collaboration with local schools, we will be installing outdoor air sensors to collect live data on air quality. These schools will serve as location centers for the sensors, fostering a shared effort to address environmental health concerns within our community.

The collected data will be publicly accessible from anywhere in the world through the Open Air Quality Index project at www.openaq.org. This online map allows anyone to explore and analyse air quality information from different locations, promoting transparency and partnership in the pursuit of cleaner air worldwide.

One of the principal objectives of the Sonairte Open Air Project is to raise awareness about air quality issues, especially among children and local residents. The collected data will be used to educate our community, revealing the impact of air quality on human and environmental health.

Why is Air Quality Important?

Air pollution is one of the biggest environmental risks to health. According to the World Health Organization (WHO), by improving air quality, the risks of diseases such as lung cancer, stroke, heart disease and respiratory issues like asthma are greatly reduced (WHO, 2022). In 2019, 99% of the world's population lived in locations where the WHO's air quality guidelines were not met, highlighting the inescapable nature of this global issue (WHO, 2022).

Outdoor air quality affects everyone, irrespective of geographical location. Weather patterns can spread polluted air far from its original source, meaning that even remote locations can be affected by pollutants generated elsewhere.

Air quality influences the health of both terrestrial and aquatic ecosystems. Nitrogen oxides are deposited on land and in water bodies and can lead to excessive quantities of nitrogen (European Environment Agency (EEA), 2022). In bodies of water, excess nitrogen reduces the amount of dissolved oxygen and can result in algal blooms and eutrophication. On land, excess nitrogen alters the species mix within an area because some plants are unable to survive in these altered conditions (EEA, 2022).

Heavy metals are toxic pollutants that can also be deposited in water bodies and land leading to a build-up of these contaminants (EEA, 2022).

Poor air quality can have detrimental impacts on ecosystems. It can cause respiratory issues in animals and plants alike. Plants can suffer damage to their stomata, reducing their ability to photosynthesise and grow (UCAR, 2024). This not only affects plant health but also has wider implications for the health of ecosystems and agriculture.

Pollutants that reduce air quality also contribute to events such as acid rain, which can damage forests, soils, and aquatic environments (UCAR, 2024). Additionally, poor air quality reduces the amount of incoming sunlight radiation, affecting photosynthesis in plants and contributing to climate change through the greenhouse effect.

Understanding and addressing air quality issues are crucial for our health and the environment. By raising awareness and educating the community about these issues, we can inspire action and promote healthier, more sustainable practices.


AIR MONITOR

Air Quality in Ireland

According to a report published by the EPA in 2022, Ireland's air quality is overall quite good but with several localised areas of concern (Environmental Protection Agency (EPA), 2023). The primary pollutants are fine particulate matter ($PM_{2.5}$) from the burning of solid fuels and nitrogen oxides (NO_x) from vehicle emissions (EPA, 2023).

In 2022, there were 79 stations around the country measuring $PM_{2.5}$. Out of these 79 stations, 76 recorded annual values that exceeded the WHO guidelines of 5 µg/m3 (EPA, 2023). Out of the 31 stations monitoring NO_2, 28 stations recorded values that exceeded the daily WHO guidelines (EPA, 2023). Currently Ireland is planning to achieve these targets by 2040 (Rialtas na hÉireann, 2023).

In order to achieve these targets there needs to be focus on insulation of homes, alternatives to solid fuel combustion, public transport and electric vehicles (EPA, 2023).

Who is Involved?

The initiative involves both primary and secondary schools in East Leinster. Schools that are participating receive a sensor, setup instructions, teaching resources, and additional support as needed. This hands-on approach promises that students and teachers are fully equipped to engage with and benefit from the project.

Partnering with schools aligns with Sonairte's core value of providing environmental education. Schools play a critical role in shaping young minds, and teaching them about air quality creates an understanding and appreciation of how our actions affect the environment. The collaboration of schools ensures that the project will have a broad reach and a lasting impact.

The first-hand approach of tracking air quality engages children more effectively than traditional teaching methods. By directly involving students in the compilation and analysis of air quality data, the program makes

learning interactive and relevant. Students can see directly how air quality fluctuates in their local area and understand the factors that influence these changes.

Looking at studies regarding hands-on learning it is clear that it is an extremely beneficial approach, particularly for science based subjects (Haury and Rillero, Nd). Benefits for students include; increased motivation, increased enjoyment, increased communication skills, increased skill proficiency, independent thinking, increased perception and creativity (Haury and Rillero, Nd). We believe that educating students using the air quality sensors will allow them to gain all of these advantageous qualities.

The Air Quality Sensors

The sensors used in the Sonairte Open Air Project are from Air Gradient and are advanced pieces of technology designed to collect comprehensive data on various air quality parameters. These sensors measure temperature, humidity, CO_2, particulate matter ($PM_{2.5}$), volatile organic compounds (VOCs), and nitrogen oxides (NO_x) (Airgradient, Nd).

Students can monitor air quality in their school using a tablet or explore other local schools air quality on the air gradient website. The data will be accessible globally through openaq.org, promoting transparency and collaboration in the pursuit of cleaner air worldwide. This initiative provides children with hands-on learning about the impact of daily activities on air quality, health, and the environment.

POLLUTANT	DESCRIPTION
$PM_{2.5}$	$PM_{2.5}$ are fine pollutant particles in the air that are 2.5 micrometers or less in width. These particles can enter the lungs and even enter the bloodstream, causing serious health issues. Ideally the levels of PM should be as low as possible. The WHO guidelines are < 5µg/m^3 (Airgradient, Nd).
VOC	There are over 10,000 types of VOCs in the air, some are very harmful, and others are harmless. VOCs are emitted from various sources including tobacco smoke, paint thinner, deodorizers, air fresheners, furniture polish, disinfectants, carpets, and plywood. Exposure to high levels of VOCs can have detrimental effects on health, causing symptoms such as headaches, dizziness, and respiratory problems (Airgradient, Nd).
NO_x	Nitrogen oxides (NO_x) refers to the sum of nitrogen monoxide (NO) and nitrogen dioxide (NO_2) in the air. These are significant components of harmful air pollution, primarily produced by automobiles and industrial sources such as power plants and cement kilns. NO_x contributes to the formation of acid rain, smog and ground-level ozone, posing a significant threat to both human health and the environment (Airgradient, Nd).
CO_2	Carbon dioxide (CO_2) is a natural component of the Earth's atmosphere, with current outdoor levels around 430 ppm. These levels are not harmful to human health but the steady increase over the past few decades is contributing to climate change and the greenhouse effect (Airgradient, Nd).

Initial Results

The project is still in its early stages, with many schools agreeing to take part and several sensors already installed. Initial data indicates that air quality is not meeting WHO guidelines but is within EU guidelines, with worse quality in urban schools on main roads and better quality in rural areas. However, more data is needed to analyse patterns and to draw accurate conclusions.

The data will help identify pollution hotspots and the factors causing poor air quality, allowing targeted actions to improve air quality and mitigate pollution in affected locations.

How to Get Involved

We are currently contacting local primary and secondary schools to invite them to participate in the project. We want to empower schools to contribute to a safer and healthier environment. If your school would like to get involved, contact the open air team at openair@sonairte.ie ■

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PROTECT YOUR SKIN TO REDUCE YOUR RISK

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The Irish Skin Foundation, a John Shelley Bursary recipient, discuss skin as a 'social canvas', sun tanning as a fashion trend and efforts to address the rise in skin cancer incidence

The skin: 'a physical and social interface' [1]

The skin, the body's largest organ[2], serves many varied and important functions. It acts as a barrier[1,2] protecting our internal organs from the external environment, against physical and chemical agents, or invasion by infectious organisms, serving as a 'watchful sentinel' [1] in immune surveillance.[3] It shields us from the harmful effects of ultraviolet radiation (UV) in sunlight and produces Vitamin D. It plays an important role in body temperature regulation[1], prevents the loss of water and other components from the body to the environment[4] and is home to millions of beneficial microorganisms, whose essential roles include the breakdown of natural products.[2]

But more than that, it serves as an interface through which we sense our environment and communicate with others. The skin is highly visible, and many aspects have become imbued with social meaning. Indeed, the skin is perhaps '...more relevant to our lives as social beings than any other organ...',[1] It has been described as a 'social canvas'[1], providing clues to our age, ancestry and health status. But beyond conveying biological details, skin can also be deliberately modified or altered in appearance, one such example is skin tanning.[1]

Sun tanning as a fashion trend

Tanning as a 'fashion trend'[5] first emerged during the 20th century[5,6] when it came to be associated with health, wealth, fashion and celebrity.[6] Earlier, women in Europe and America were careful to maintain a light skin tone, accessorising with large hats and parasols during summer. In terms of a cultural shift, social attitudes moved away from sun-protection towards sun-seeking around the late 1920s.[5] Tanned skin is still considered attractive to the present day[7]; to many, the association with health and beauty persists[8] with people reporting looking and feeling better with a tan.[7]