Climate School 180

Planting to reduce pollution options for your school grounds

Introduction

If you are a school next to a busy road or near to industry that creates pollution affecting your school, you might find that air quality has been identified as one of your key themes to focus on.

Nature-based-solutions can really help you reduce the impact of air pollution in your grounds. In this document, we outline some of the key features of those solutions to help you make your grounds, and classrooms, healthier spaces for your pupils to spend time in.

Here we provide you with an overview of the different types of solution you could add to your grounds. You can use this information to help you plan changes to your grounds to help reduce pollution within your site.

However, if air pollution is a serious problem for you, we suggest you consult a clean air specialist or landscape architect to advise you on your final species selection and planting pattern.

Creating buffers

A buffer in this situation is just something that forms a barrier between you and the source of pollution you are concerned about. This will never be 100% effective but can reduce particulate and gases by as much as 60%, according to studies by the US Environmental Protection Agency, making a significant difference to the quality of air your pupils, and staff, are exposed to every day.

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What should a buffer look like?

Firstly, any buffer should be as near to the source of pollution as possible and, for most impact, downwind of the prevailing wind. This will ensure the greatest benefit. Any buffers should be at least 2.5m in height, ideally 1m deep and as dense as possible. Ivy, bushes, hedges and trees that have vegetation from ground level upwards and are planted close together are the best natural buffers. It is important to consider the types of vegetation that this buffer is made up from. Too porous, and the air funnels and slows through the gaps so that gases and particulates increase in concentration as they pass through. A fence or wall with plants growing over the top can also be particularly effective.

Maintenance is essential, and any gaps should be refilled as quickly as possible.

This also means that 'lollipop' trees (trees with a clear trunk below their branches) are not effective at stopping pollution unless there is also shrub planting or a solid barrier below the level of the branches. A combination of hedge, shrubs, ivy and trees can be one of the most effective barriers – sometimes called a 'tredge'.



To get the quickest results, you might decide to plant larger trees and shrubs than for most planting schemes, or you can buy quick growing ivy in pots or in pre-grown 'green screens'. Planting more mature trees is more expensive, but you may be able to get help with funding (see the funding list in the CS180 resources). You will also need to make sure these trees and shrubs are well watered during the school holidays as they get established.

How to choose your plants

The species choice is an important consideration. Evergreen species will generally be most effective as they will continue to filter pollutants throughout the seasons. The RHS has a list of plants that are good for trapping pollution and are carrying out research in school

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grounds on what makes a good hedge for this use. Often plants with hairy or waxy leaves are the best at trapping pollution.

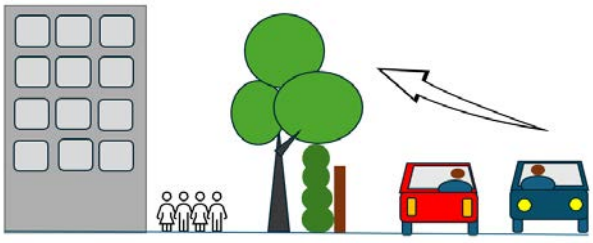
RHs research has found that Cotoneaster franchetii is a particularly good shrub to trap air-born car pollutants with its hairy leaves whilst researchers at the University of Surrey have found that marjoram, lavender and ivy used in a green wall can help clean up the air too. They believe that a mixture of species will create the most pollutant filtering green walls – although further research is needed to be sure.

Pine and other coniferous trees can make good buffers. This is because they are not affected by the seasons and also have complex, rough, waxy surfaces that help to capture the pollution. However, these trees may also thin out on their lower branches, so do make sure they are regularly checked for gapping. Gaps could be filled with shrubs or a fence.



Other characteristics to consider are whether you want to plant native or non-native plants, whether the plants are resistant to drought or flooding, and that they can survive being by a roadside. For example, can they cope with salt that is used to keep roads safe on an icy day? To find out which plants can cope in these conditions, talk with an arborist or horticulturalist. Although, a web search to find salt-tolerant plants will also help you choose the best for roadside planting.

Using walls or solid fences as well as plants



A wall or solid fence can also help to prevent some pollution getting into your school grounds. A barrier, such as a wall, with vegetation growing at the top of it can be even more effective. This is because the air is pushed up over the wall and pollutants are deposited on the leaves, whilst methane is also removed through the soil.

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Screening specific space and places from pollution

Also consider the pollution that gets into your classrooms from outside of your building. If you are heavily affected by the rush-hour, avoid opening windows at this time of day. You can also consider travel plans and encouraging fewer journeys, drop-offs and idling engines near to your school. Adding vertical planting outside of classrooms can also help to reduce the pollutants entering in through doors and windows. This can be planters with vertical mesh, or trellis where climbers such as ivy can grow upwards. Make sure you consider how these will be watered and maintained before you add them to your grounds – this could be using water from the roof of the building.

You can also consider planting around seating areas or other areas that are heavily used. Whilst the best place for a barrier is close to the source of the pollution, additional planting could help if placed downwind of the prevailing wind and will have many other benefits.





Other benefits of using plants to filter pollution

Using vegetation in this way can have many co-benefits, some of which you may be looking at as part of your CS180 project. These include:

- Reducing noise levels
- Reducing storm-water impact including flooding
- Creating a positive feature in an area which can increase mental health and wellbeing
- Helping to combat overheating in urban areas
- Increasing biodiversity on the site

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Checklist of considerations when planning pollution buffers

	Considerations
Pollution source	Place/plant barrier as close to source as possible
Prevailing wind	Create the buffer downwind of any air pollution but upwind of the school.
Only using plants	Buffer should be at least 2.5m high and 1m deep Use dense planting without gaps from the ground to the top of the planting Choose evergreen species for year-round protection Do not plant 'lollipop' trees Make sure any gapping is filled as soon as possible
Using walls/fences	Consider using a wall or solid fence that exists already before building Grow plants above the height of the wall or solid fence
Species type	Check on the RHS list Plants with waxy or hairy leaves are most effective Make sure the species are right for the location i.e. can tolerate salt from the road or the soil you have in your grounds Talk to a local arboriculturist, horticulturalist or landscape architect Your local authority may also be able to help

This information sheet was informed by:

- The Green Schoolyards America Schoolyard Forest Design Lecture
- Waltham Forest – Green Screens Reducing Pollution
- Groundwork and University of Lancaster – Tredges to reduce pollution

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