

## Ventilation in Education and Childcare Settings

### Advice from the Education Infection Prevention and Control Team

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#### How do I keep heating costs at a minimum whilst keeping the setting ventilated?

Some settings may be considering how to maintain good ventilation during the autumn and winter, whilst also minimising heating bills and keeping rooms at a comfortable temperature. Achieving a balance between the two can seem difficult. Consider the following approach.

#### Step 1: Work out if you actually have an issue with ventilation and respond accordingly

All settings should have access to Carbon Dioxide (CO<sub>2</sub>) monitors. People breathe out CO<sub>2</sub>. If there is a build-up of CO<sub>2</sub> in an area, such as a classroom, it can indicate that ventilation needs improving.

Follow the Health and Safety Executive (HSE) [guidance](#) to make sure you are using your CO<sub>2</sub> monitor correctly.

The table below summarises the action you should consider taking, based on the CO<sub>2</sub> reading (given as ppm).

CO <sub>2</sub> Level	Description	Actions	Outcomes
>1500ppm	Indicates inadequate ventilation	Increase ventilation e.g., open windows and doors fully (not fire doors). If CO <sub>2</sub> levels do not reduce, or room temperature is consistently too cold, consider step 2 described below this table.	There are quite high levels of shared/rebreathed air in the room, which could lead to poorer learning and health outcomes
800 – 1500ppm	Indicates environment with stuffy / stale air	Start by opening high level windows first if you can (less heat loss than lower-level windows). If CO <sub>2</sub> levels do not reduce, open lower-level windows and doors (not fire doors). If CO <sub>2</sub> levels do not reduce, or room temperature is consistently too cold, consider step 2 described below this table.	May lead to poor concentration levels among learners
< 800ppm	Indicates good ventilation	If open, consider gradually closing the window opening extents to find the lowest level of ventilation required to maintain this reading (and keep heat in).	Reduced risk of airborne virus transmission. Better concentration levels
Close to, or just above, 400ppm	Typical outdoor reading	If open, consider gradually closing the window opening extents to find the lowest level of ventilation required to maintain a reading of <800ppm (and keep heat in).	Room may be too well ventilated and in winter months, temperature too cold to learn comfortably

## **Step 2: What to do if CO2 levels are high and you cannot open the windows OR CO2 levels are still too high with windows and doors open.**

- Check the CO2 monitor is working properly and is being used correctly
- Keep a daily record of the CO2 readings
- Consider speaking to your health and safety provider about possible remedial works that may be required (e.g., repairing windows that are painted shut, adding air flow vents, possible installation of mechanical ventilation or air cleaners). We know remedial works and equipment cost money, but they may be more cost effective in the longer term than increased heating bills or paying for supply staff because members of your team are off work ill.

## **Step 3: Factors to think about if you are considering purchasing air cleaners**

### **Value for money**

Even with higher electricity prices, air cleaners may be cheaper to run than opening windows and also trying to heat rooms at the same time. For example, a 30W device can have an effectively high airflow rate. Based on the October 2022 price cap (52p/kWh), a device of this size would cost about 1.5p per hour to run.

### **CADR**

Look for devices that have a high Clean Air Delivery Rate (CADR). Aim for adding around 4 Air Changes per Hour (ACH) in most rooms.

2-4 smaller devices may be better than one. Professor Cath Noakes (who has advised DfE previously on ventilation) advises that you can work out the number of devices needed by calculating  $4 \times \text{room volume (m}^3\text{)} \div \text{the device CADR (in m}^3\text{/h)}$ .

### **Power rating**

Also look at power rating (W) - the lower it is the less energy. Many devices quote the maximum power for the “turbo” setting. Look for the power at the CADR you want, which is often lower.

### **Noise levels**

Also look at noise ratings. If it's used in a noisy space, there is not likely to be a problem, however if it is a quieter space like a classroom, library or office, aim for a unit that operates at under 50dB (and preferably under 45dB).

### **Maintenance and filter replacement**

You do need to think about maintenance and management of the unit, especially if you have lots of units. Think who will look after them and the cost of filters. Vacuuming filters can extend life, but they usually last at least 12 months. The cost of filter replacements depends on the make and model of the unit.

### **What should I expect to pay?**

- Units suitable for smaller rooms (or if using multiple devices in larger rooms) are likely to cost between £300-£600.
- Units suitable for larger rooms are likely to cost between £800-£1500.

Some companies also hire air cleaning units to schools.