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# AIR QUALITY CHAMPIONS

## Training session 1 - Air quality background















# A REMINDER OF THE PROJECT








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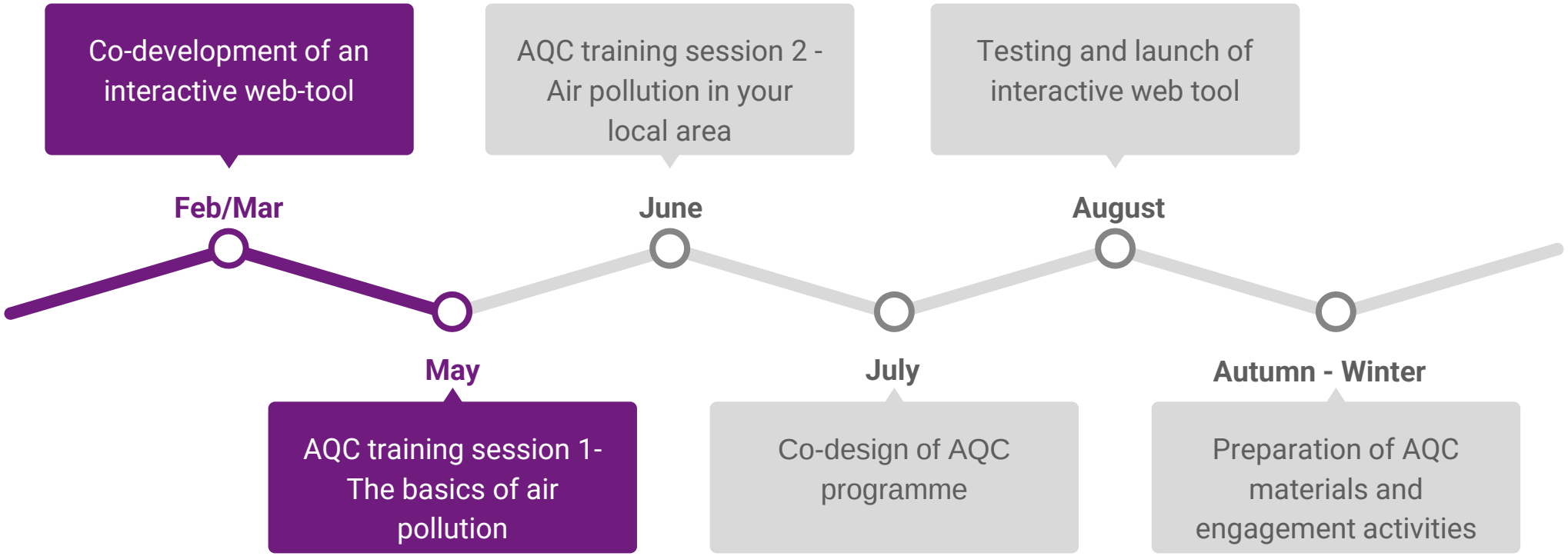
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# AIR QUALITY CHAMPION (AQC) PROGRAMME




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# TRAINING - SESSION 1

Today's training session brings together key background information on air quality:

- What air pollution is
- How it affects your health
- The actions you can take to protect your own and others' health
- Air quality forecasts

- Key principles to use when talking about air pollution
- Facts and myth busting

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# VIDEO



# AND BREATHE…



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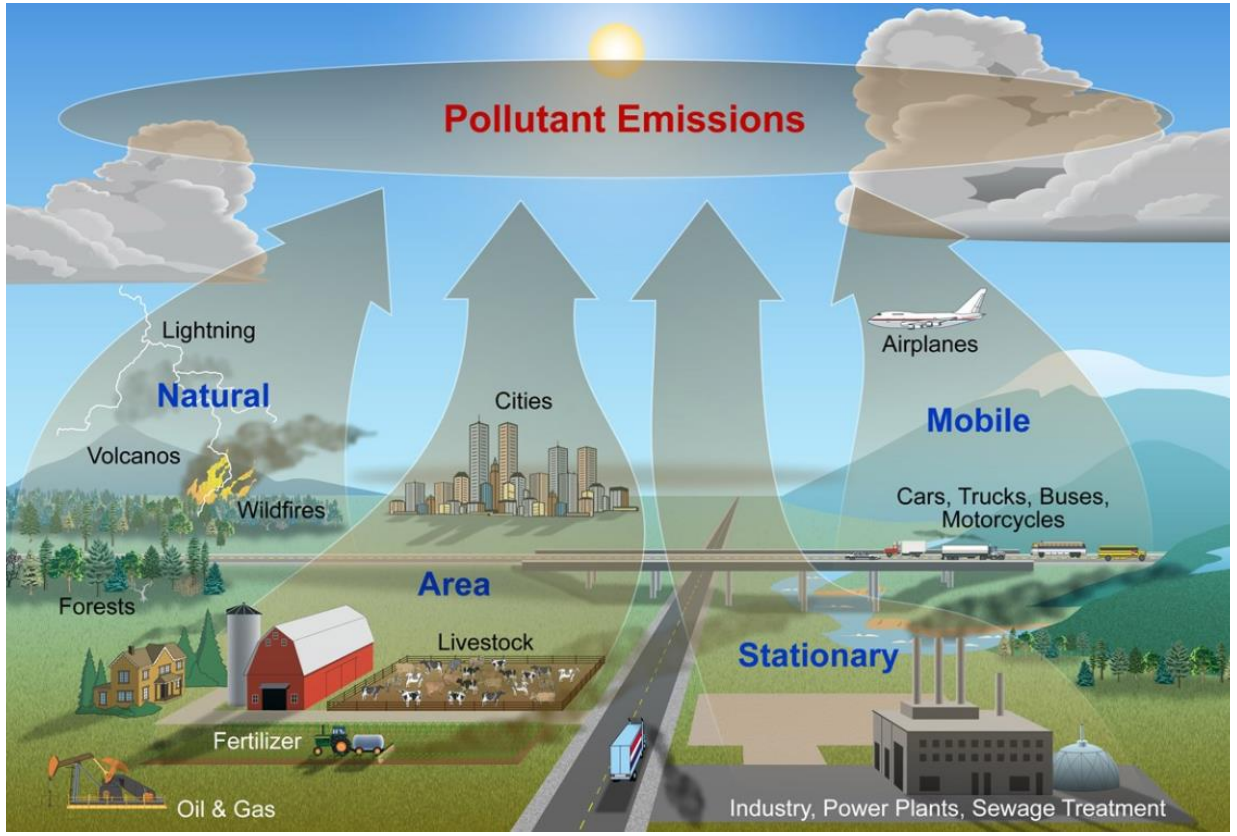
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# WHAT IS AIR POLLUTION?

- Air pollution refers to the release of pollutants into the air that are detrimental to human health and the planet as a whole.
- Pollutants can be released both naturally and through man made activities. Man made activity is a much more significant contributor to air pollution.
- Different types of air pollutants exist. The relative contribution to overall air pollution varies by both source and pollutant.




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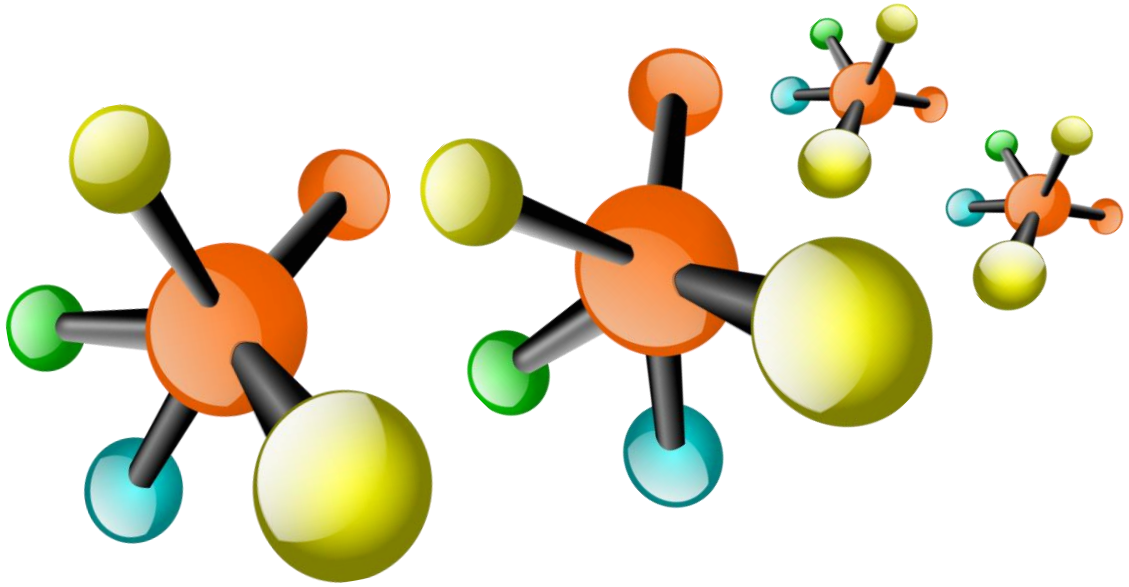
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# WHAT ARE THE MAIN AIR POLLUTANTS?

1. Nitrogen dioxide (NO2) (from the Nitrogen oxides (NOx family).

1. Particulate matter (PM)

1. Ozone (O3)



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# OUTDOOR AIR POLLUTANTS: NITROGEN DIOXIDE

- Nitrogen Dioxide (NO2) is (mainly) man made and is one of the two most prevalent air pollutants.
- NO2 is a contributor to smog and ground-level ozone and occurs when emissions from combusting fossil fuels react in sunlight.
- It is highly reactive and concentrations of it in the air change over short distances. Road transport, including cars and delivery vehicles, is the main source of NO2.



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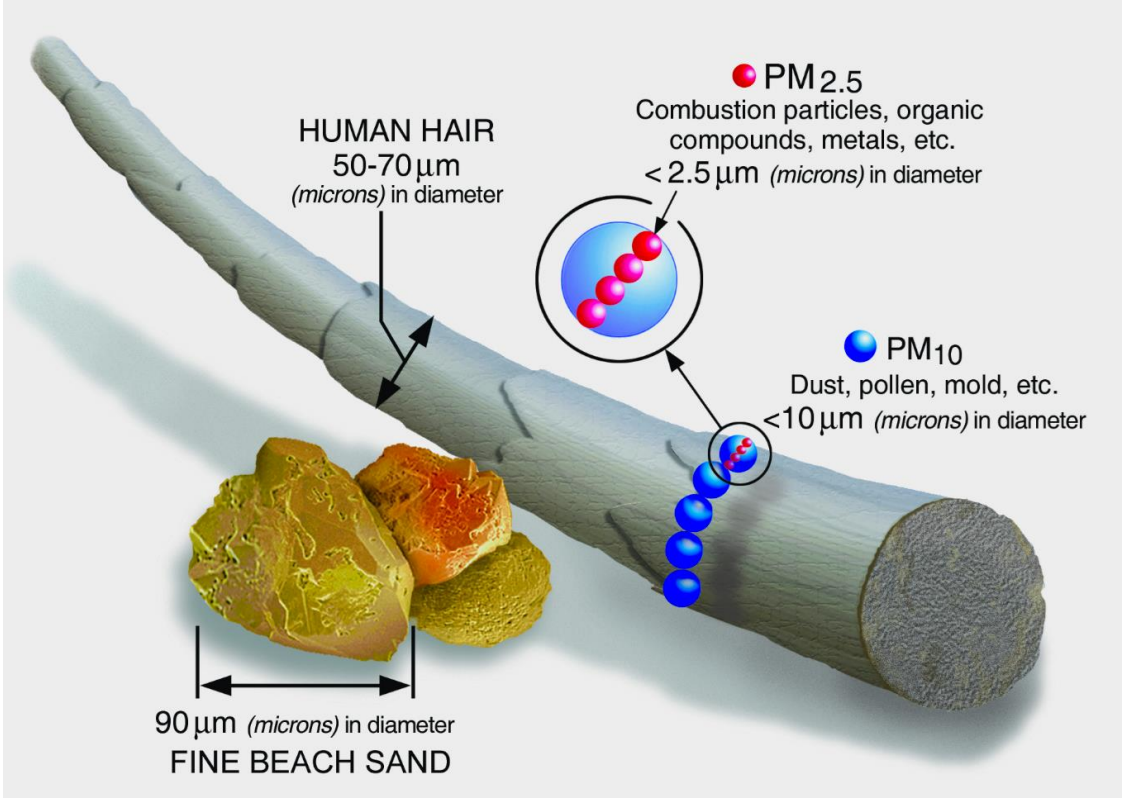
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# OUTDOOR AIR POLLUTANTS: PARTICULATE MATTER

- Particulate matter (PM) is the other most common air pollutant. There are 2 main types, referred to as:
  - PM10
  - PM2.5

- Particulates are made up of tiny particles of chemicals, soil, smoke, dust, or allergens, in the form of gas or solids, that are carried in the air.

- Household burning by wood stove or open fires, is the biggest contributor to PM pollution.

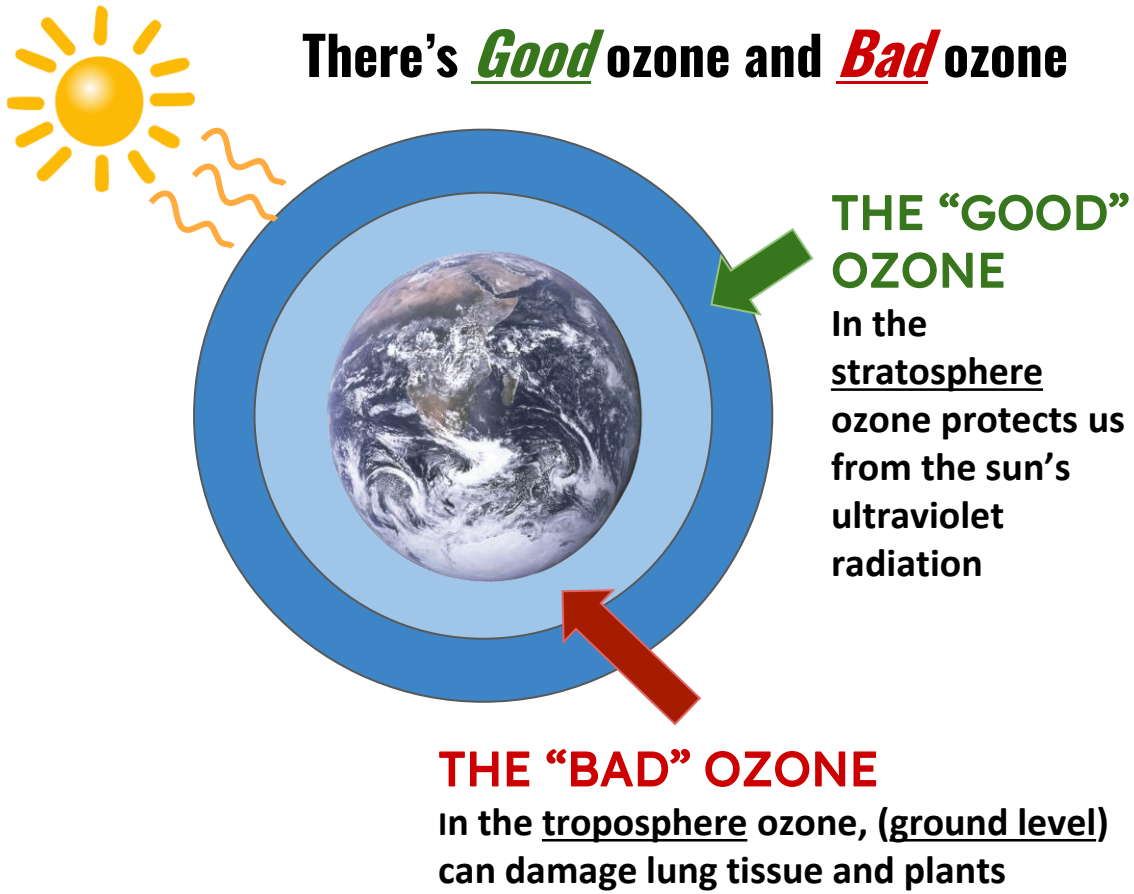



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# OUTDOOR AIR POLLUTANTS: OZONE

- Ozone (O3) is another recognised and significant air pollutant, *however* not all ozone is bad.
- Ground level ozone is damaging to our health, whereas ozone in the upper atmosphere is needed to protect us from UV-B rays; helping to prevent sunburn and cancer.
- Ozone in the lower atmosphere around us is created when other pollutants are exposed to and react under sunlight. For example: $NO_2 + O_2 \rightleftharpoons NO + O_3$
- So we get the most ozone in warmer weather and when other pollution levels are high.

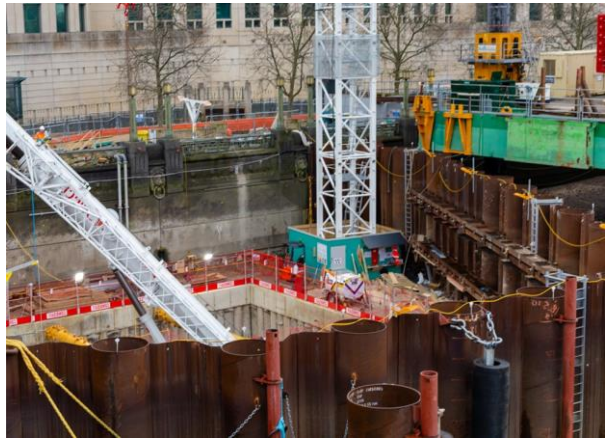



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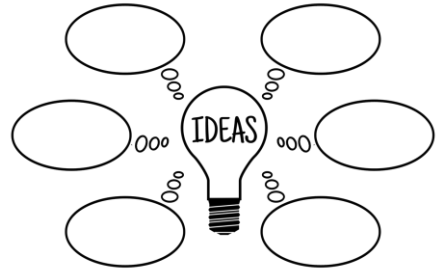
# WHERE DOES OUTDOOR AIR POLLUTION COME FROM?












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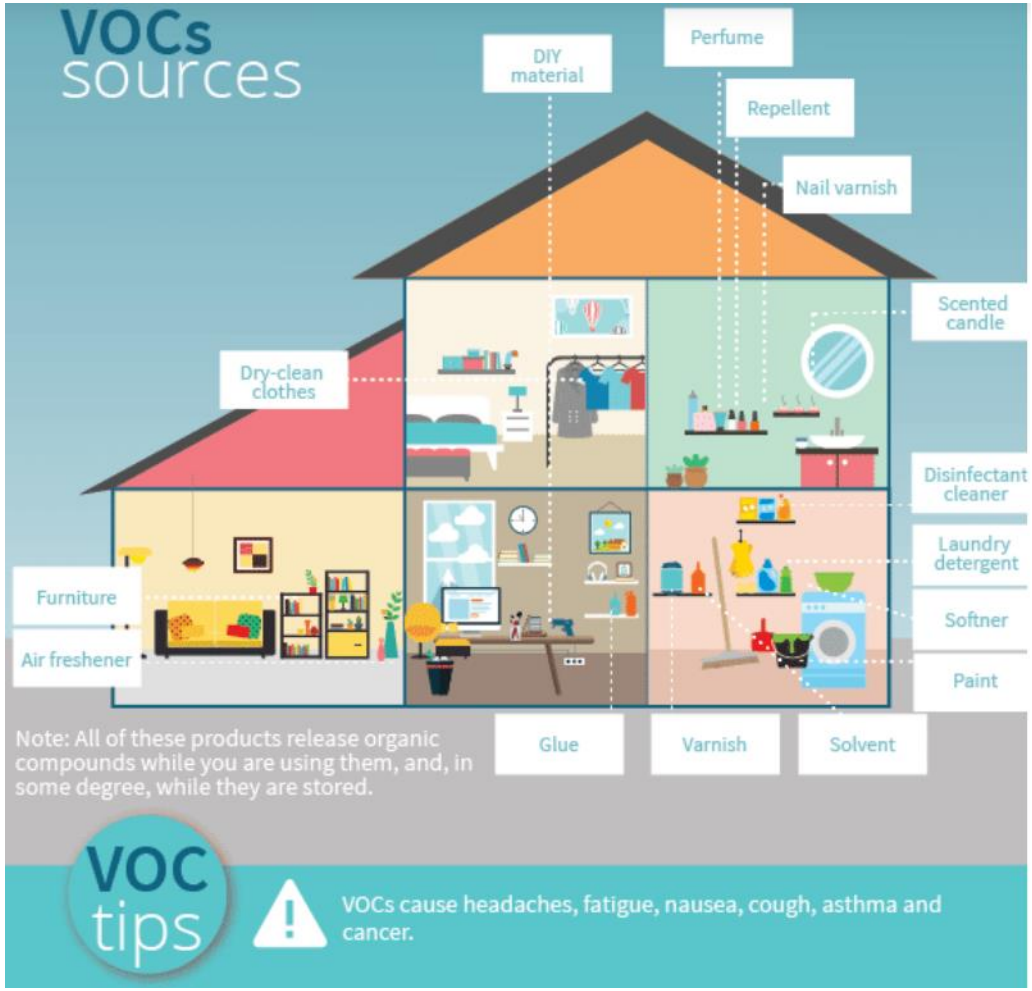
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# INDOOR AIR POLLUTANTS: CHEMICALS

- There are lots of chemicals which contribute to indoor air pollution including those known as volatile and semi volatile organic compounds (SVOCs). Once these chemicals mix with the air, they are very easy for us to breathe in.

- Items we use everyday contain these chemicals - You can often tell when things contain a lot of these chemicals because they can have a very strong smell after you have used them

- Another chemical, formaldehyde can be given off by manufactured furniture, furnishings, fabrics, glues and insulation materials.

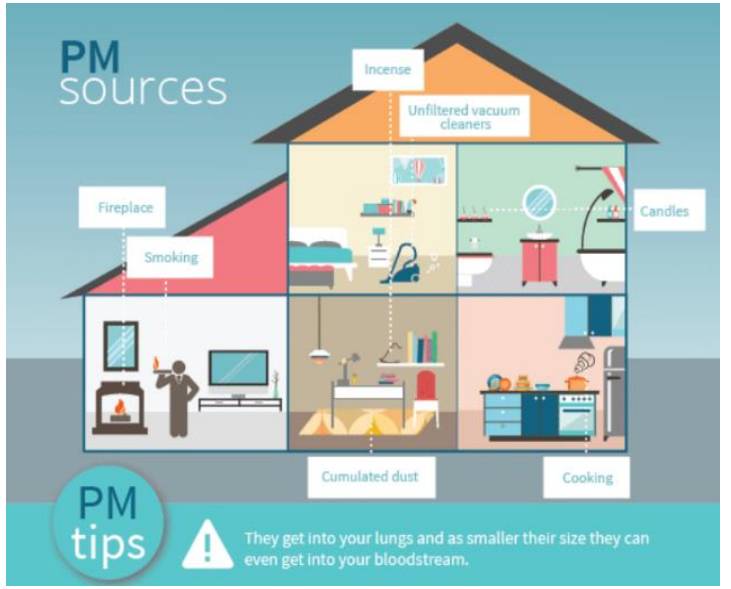


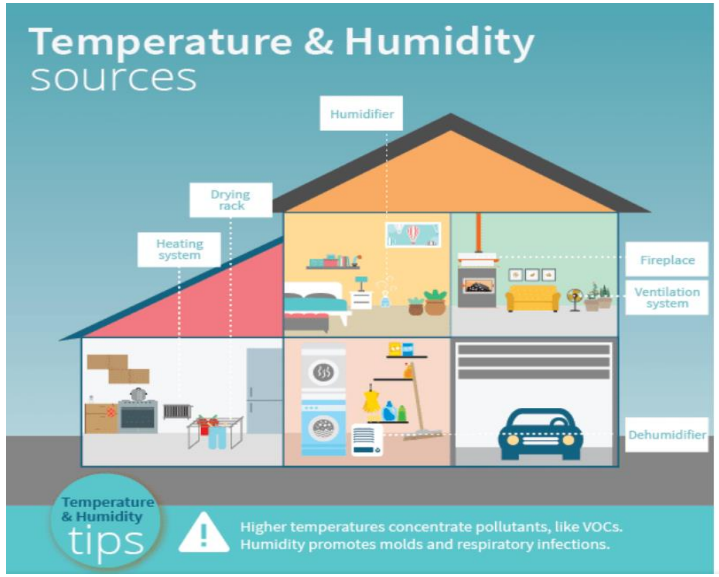

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# INDOOR AIR POLLUTANTS: PARTICULATES

- As well as in outdoor air, particulates also occur inside the home. These include dust particles, pet dander, sooty residues, smoke and mould spores.
- Temperature and humidity conditions inside the home can affect particulates. For example, mould tends to grow in damp places. The damp might be because of a leak, but is often because of condensation.
- Condensation often forms in bathrooms with inadequate ventilation, in kitchens from washing up and from cooking, and also from drying clothes indoors.

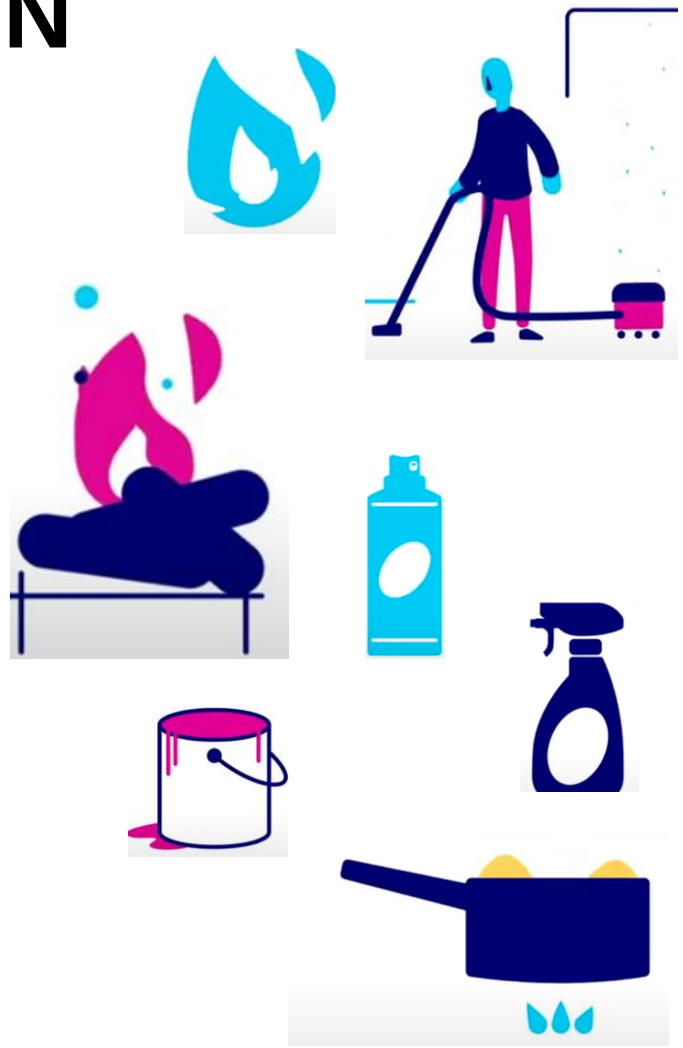



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# SOURCES OF INDOOR AIR POLLUTION

- **Cooking, smoking, burning solid fuels** (e.g. wood, coal, charcoal)
- **Domestic appliances** (boilers, heaters, fires, stoves and ovens), which burn carbon containing fuels (coal, coke, gas, kerosene/paraffin, wood)
- **New furniture and furnishings,** which can be sources of pollutants such as volatile organic compounds (VOCs) or formaldehyde.
- **Building materials** (including fittings and flooring), can emit VOCs.
- **Consumer products**, including household (e.g. paints, aerosols, cleaning products and candles) and personal care products (cosmetics, hair sprays), which can emit VOCs and SVOCs.
- **Flame retardants, pesticides, disinfectants,** which can release SVOCs.
- **Biological sources**, including mould, house dust mites, bacteria, pests and pet dander which increase PM.



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# DOES THE AMOUNT OF AIR POLLUTION AROUND ME CHANGE?

- Air pollution gathers around the areas where it is formed. So places that have lots of traffic, domestic wood fires, industry or farming can have higher levels of pollution.

- Closing roads to traffic can reduce air pollution on those roads almost straight away. This year Global Action Plan calculated that air pollution on a major road in London was 89% lower when the roads were closed for the London Marathon than on a normal Sunday. This is because generally the more traffic there is, the more pollution there usually is.

- Pollution changes at different times of year too. Ozone pollution forms in direct sunlight, so more is generated on particularly sunny days and levels are likely to be higher in spring and summer. In winter, when there is particularly cold air at ground level and warmer air above it, air pollution can become trapped until the weather changes again.

- Some seasonal events, like bonfires and fireworks, also result in higher levels of air pollution during the displays and for a time after.

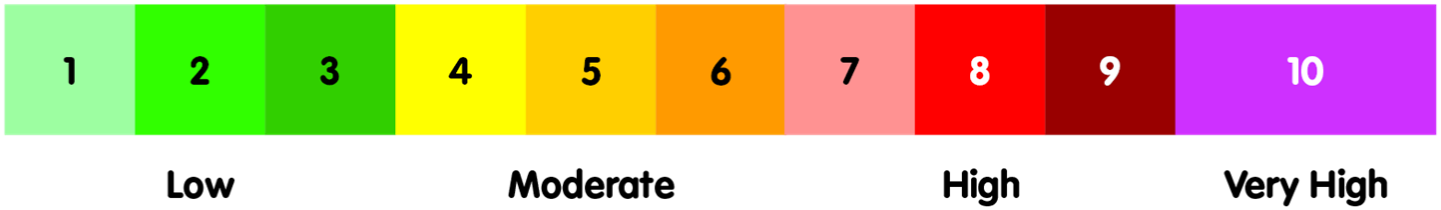
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# HOW POLLUTED IS IT WHERE I AM?

- Local Authorities and the UK Government make the latest air pollution forecasts available online. On the Defra page you can search by UK town or postcode and on the LondonAir page you can see forecasts for several days.

- Forecasts are graded from pale green (low) to purple (very high). If you have a medical condition made worse by air pollution, it can be best to reduce strenuous activity outside on high pollution days.

- There are notification services such as AirText which use this forecast to alert people in a variety of ways when local air pollution levels are high.




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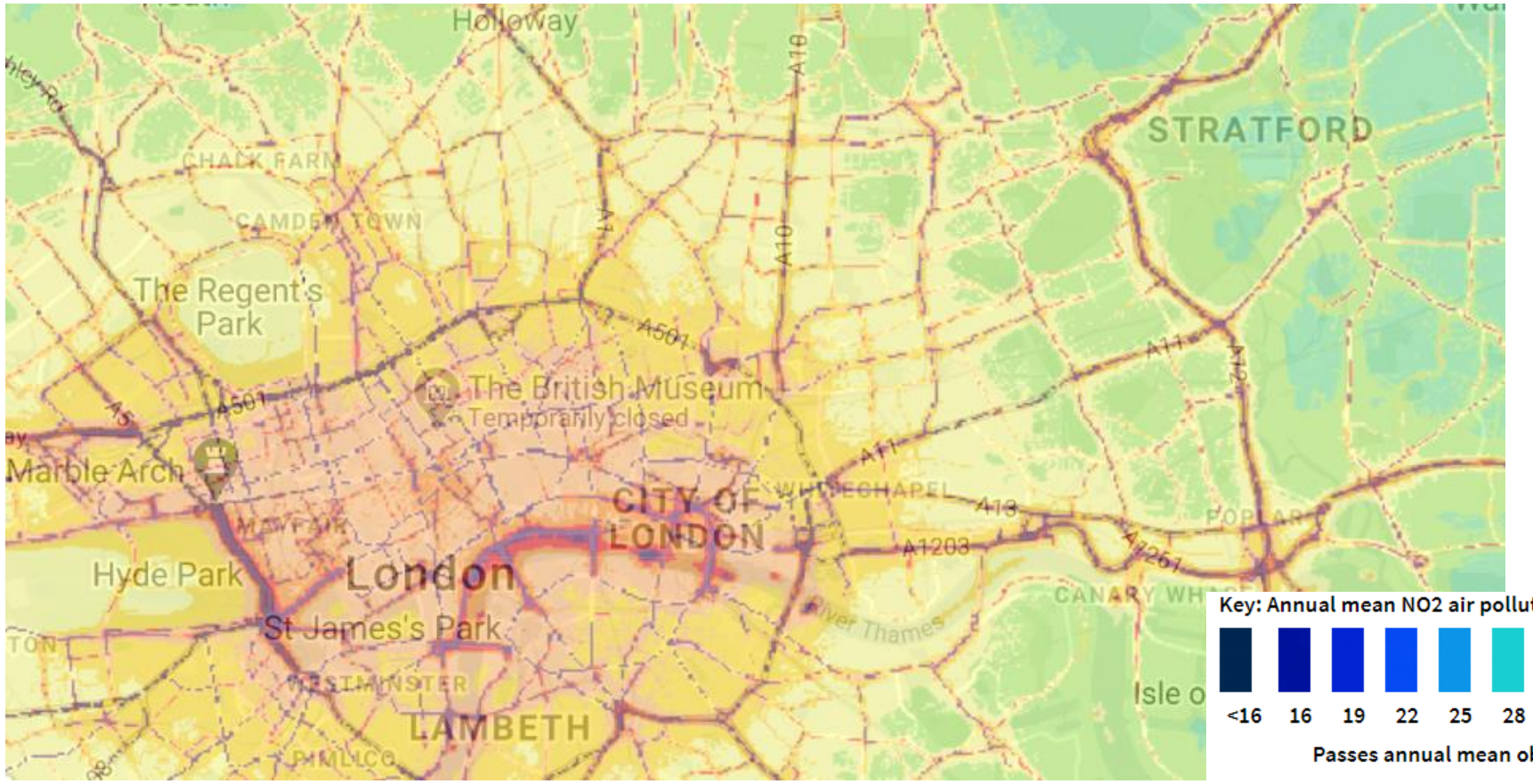
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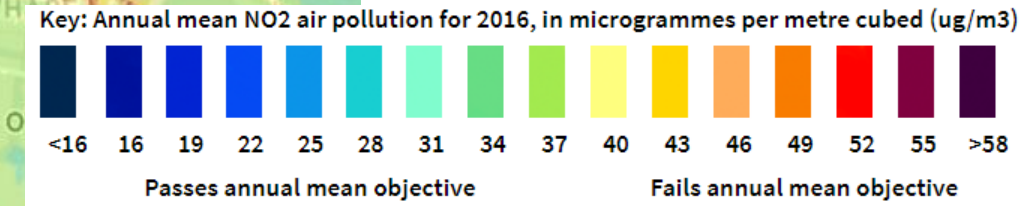
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# AIR POLLUTION IN LONDON




https://www.londonair.org.uk/london/asp/annualmaps.asp

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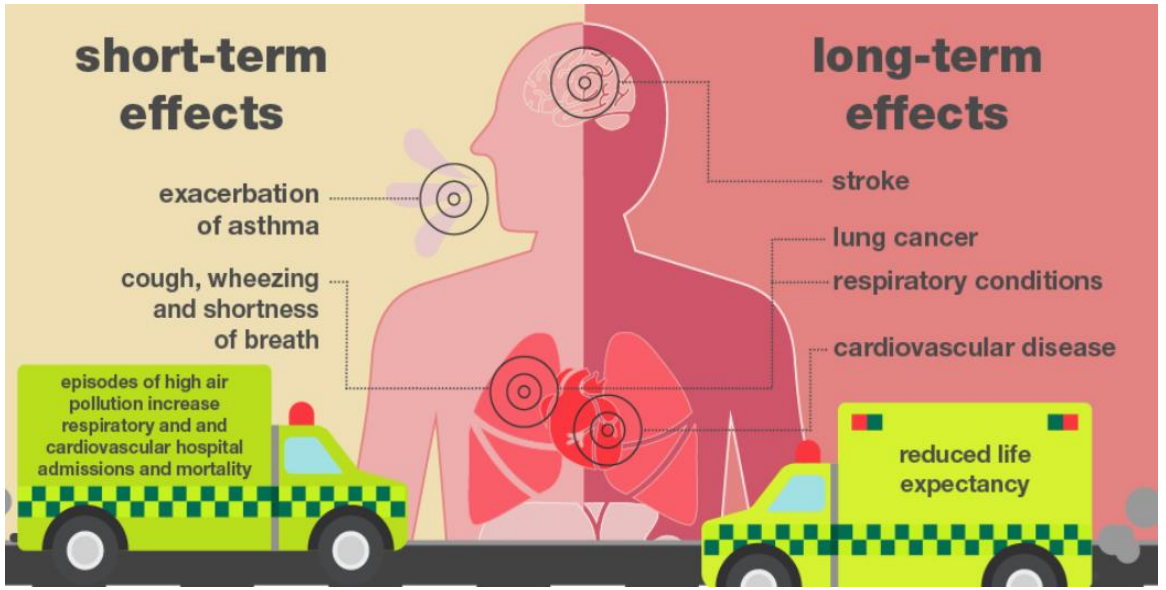
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# HOW DOES AIR POLLUTION AFFECT OUR HEALTH?

Our physical and psychological wellbeing is affected differently by the kind of air pollution we are exposed to causing potential health problems such as:




- Respiratory diseases
- Cardiovascular damage
- Fatigue, headaches and anxiety
- Irritation of the eyes, nose and throat
- Damage to reproductive organs
- Harm to the liver, spleen and blood
- Mental health issues
- Dementia
- Low birth weight leading to premature birth and pregnancy loss.

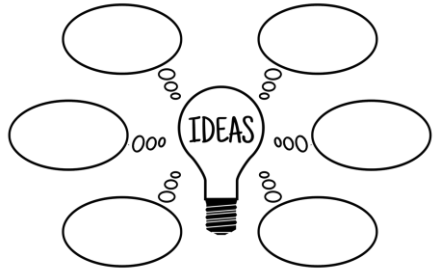
Long-term exposure to air pollution can cause chronic heart and lung conditions such as coronary heart disease and COPD as well as lung cancer, leading to reduced life expectancy.

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# HOW WE CAN PROTECT OURSELVES FROM POLLUTION: OUTDOOR ?






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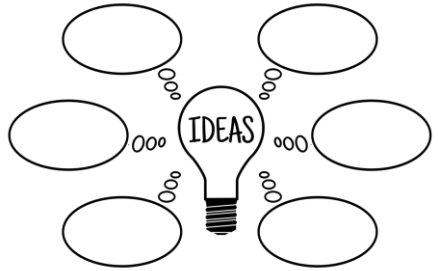
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# HOW CAN WE PROTECT OURSELVES FROM POLLUTION: INDOORS ?






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# OUR INDIVIDUAL ACTIONS CAN ALSO HELP OTHERS







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# HOW IS REDUCING AIR POLLUTION ALSO A MEANS TO TACKLE THE CLIMATE CRISIS?










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# FORECASTS & USEFUL INFORMATION

- The London Air and Air Quality England websites both show current air pollution levels across London (AQE - covers England too) and offer short term air quality forecasts by postcode areas.

- On these websites you can also find out where local air quality monitoring stations are located and download their data too. The Breathe London network shows current and average air quality levels from their monitoring network.

- In addition, the London Air website provides mapped historical and estimated future pollution levels - useful for looking at long term rather than immediate exposure

- The IQAir website again provides real time pollution levels in London (and around the world) and displays and compares results for key cities according to the US AQI.

- You could also create an annual pollution map for your local area to see where the hotspots of high pollution near you are.

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# DISCUSSION / QUESTIONS

