
Air pollution detectives

Explore air particulates in your local environment and look at how they can affect us.

You'll Need

- String
- Permanent markers
- Compass
- 4 large square shaped, clean, recycled cartons (such as orange juice)
- Double sided sticky tape
- Magnifying glass

Activity Outcomes

Help your community

Be able to take an active role in the community, give to others, and make the world a better place.

Live Healthily

Gain awareness and practical skills to take care of your body and mind.

What's air pollution

The focus of this activity is air pollution. This is the release of harmful chemical and substances into the air we breathe, both indoors and outdoors.

Air pollution affects us all. The particles and gases that make up this pollution enter our bodies, and can be damaging to our physical and mental development.

By breathing in the pollutants, they can have impact our lungs, and enter our blood stream, damaging our heart or brain. The more of these pollutants we breathe, the higher the risk of harm and the bigger impact it can have on our health.

There are many causes of air pollution.

Outdoor air pollution's caused by:

- vehicles (cars, vans, planes, trains, boats and so on)
- factories
- farming
- burning fuel (bonfires, wood burners, barbecues and so on)

Indoor air pollution is caused by:

- cooking
- chemicals in cleaning or personal care products
- dust
- mould

Outdoor air quality in the UK has improved significantly during the past 40 years. But there is no safe level of air pollution, and there is still more we could do.

Set the scene

1. Ask the group to take some really deep breaths and try to fill their lungs. Ask them to describe the air around them. Does it taste of anything? Does it smell of anything? Can they see it?

What's in air?

2. Our air contains:
 - 21% oxygen,
 - 72% nitrogen,
 - approximately 7% carbon dioxide
 - approximately 1% other gases, including pollutants
 3. Explain that most of the gases and particles that make up our air, including oxygen, nitrogen and carbon dioxide, are colourless, odourless and tasteless. That means we can't see them. However, some of the pollutant's particles are big enough to be visible to the naked eye.
 4. Discuss air pollution. Think about what it is and where it comes from in your local area. What impact does this have on our health? How might this impact the community? How does this make us feel?
 5. Tell everyone to think about your current location. Can anyone think of any sources of air pollution that are nearby or activities they've done that added more air pollution today? It's OK if they have.
 6. Ask everyone how they think we can we find out how polluted our environment is? Choose a few people to share their ideas. Then explain sources of air pollution and how particles like dust often leave residues on the top of exposed surfaces. This makes air pollution 'visible' and easier to understand. The air pollution in different areas can be compared and related to the source of the pollution.
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Start the activity

1. Tell everyone that you're going to make some pollution detectors and place them in your local area.
2. Give each group a carton, a roll of double sided sticky tape and a marker.
3. Mark each side of the carton with North, East South and West.
4. Cover the outside of the carton with double-sided sticky tape and peel the tape to reveal the sticky part. Make sure you don't contaminate the surface with clothes fibres or dust. Try to keep them as clean as possible.
5. At this point it would be worth considering the weather during the time your detectors are out. Can you weather proof your detector while still letting pollutants in?
6. Each group should decide on a different location in your local area to leave your pollution detectors. Think about how you can compare how different environments might achieve different results.
7. Some suggested locations could be inside your meeting place, just outside your meeting place, by a road, in a field, in a car park, in some woodland, in a park or in someone's garden (such as a volunteer's).
8. Head out and place your detectors in your selected locations. Use your compass to align each detector. At each location discuss what the expected results might be.
9. Each group should have a volunteer assigned to them and then go and leave their detector in their chosen place until the next meeting. They may want to hide them well or you could leave a note with them, so they don't get moved or thrown away.
10. At your next meeting, gather your detectors carefully to avoid any cross-contamination.
11. Back in your meeting place, use the magnifying glass and count any visible particulates that can be seen on your detectors. Keep a note of each side separately.
12. Discuss your results. Which detector collected the most particulates? Was this what you were expecting? On your most polluted detector, did each side have a similar number of particles? What does this tell you?

Ideas to reduce air pollution

All young people

Reduce exposure to air pollution

- Open windows to let the fresh air in – especially when your family is cooking or cleaning.
- Discover quieter routes to school and other places you travel to; avoiding busy roads where possible. Walk on the pavement that's furthest from the road, especially if you're on a busy road.

Reduce our contribution to air pollution

- Ask parents/carers to get fragrance-free milder cleaning and personal care products.
- Try to avoid non-essential deliveries or chose the low emission delivery option when shopping online.
- Ask parents/carers if you can walk, cycle, scoot, wheel or take public transport whenever you can instead of driving in a car.
- Don't idle – ask adults to turn off their engines when the car isn't moving, and especially around schools.
- Raise awareness about air pollution and what needs to be done to improve it at your school (e.g. via school councils) and in your community. Call on government, businesses and other decision makers to help make the changes you want to see, for a cleaner air future!

Young people with health conditions

- Ask parents/carers not to burn things indoors e.g. candles and log burners.
- Ask people not to smoke in your home, or near you.
- Open windows to let the fresh air in – especially when your family is cooking or cleaning.
- Ask parents/carers to get fragrance-free milder cleaning and personal care products.
- Discover quieter routes to school and other places you travel to; avoiding busy roads where possible.
- Talk to your doctor or nurse about how air pollution impacts your health condition. Ask for more information about what you and your family can do.
- Ask an adult to help you sign up to air pollution alerts and follow the guidance that it gives you
- Ask an adult to help you find out more information about your health condition and air pollution (e.g. Asthma Lung UK website)
- Sign up to an air quality alert to know when air pollution levels are particularly high so that you can avoid it.

Reflection

In this activity we explored air pollution in our local area. What were the results like? How does this make you feel?

To do this we carried out a scientific investigation, even if we did not call it that. Do you think your results were accurate? Could we do anything to improve this experiment?

You have the power to decrease air pollution and encourage your family and communities to take actions together. What can we do to reduce our own impact on local air pollution? What do we tell our communities?

Change the level of challenge

There're other ways that air pollution can be 'seen'.

You could walk round the local area and investigate buildings made of stone. These can show evidence of air pollution, often caused by vehicles on adjacent roads or from acid rain. Look out for natural stone that looks 'dirty' or corroded. Graveyards or older monuments and statues are also good places for seeing the effect of air pollution on stone. You could also look at road signs to see the affect that cars and vehicles have and how the air pollution causes them to become dirtier over time. Depending on where you live, you may be able to see smoke plumes from factories, too.

You could also find out how scientists measure air quality, too. Or, think about how our actions can contribute to creating more air pollution, as well as what we can do to help.

Safety

All activities must be safely managed. You must complete a thorough risk assessment and take appropriate steps to reduce risk. Use the safety checklist to help you plan and risk assess your activity. Always get approval for the activity, and have suitable supervision and an InTouch process.

Outdoor activities

You must have permission to use the location. Always check the weather forecast, and inform parents and carers of any change in venue.

Road safety

Manage groups carefully when near or on roads. Consider adult supervision and additional equipment (such as lights and high visibility clothing) in your risk assessment.

Visits away from your meeting place

Complete a thorough risk assessment and include hazards, such as roads, woodland, plants, animals, and bodies of water (for example, rivers, ponds, lakes, and seas). You'll probably need more adult helpers than usual. Your risk assessment should include how many adults you need. The young people to adult ratios are a minimum requirement. When you do your risk assessment, you might decide that you need more adults than the ratio specifies. Think about extra equipment that you may need to take with you, such as high visibility clothing, a first aid kit, water, and waterproofs. Throughout the activity, watch out for changes in the weather and do regular headcounts.

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