

7th- 8th Grade Science / Geography / Civics Lesson Adaptable for 9th-10th Grade Classrooms

Notes for educators:

The Freedom to breathe teaching resources have been developed by educational professionals and will achieve three key learning outcomes. **Students will:**

1. Understand the state of air quality in their city, and how it compares to other cities.
2. Understand the health impacts of air quality on their physical health, mental health and their ability to learn.
3. Understand how they can claim their right to clean air by understanding what the UN Convention on the Rights of the Child is. It is focused on their rights to the best possible health, clean water and a clean environment (article 24), but does not include the explicit 'right to clean air.'

Curriculum links: this primarily links to the Next Generation Science Standards, but of course also touches on History-Social Science Standards

Freedom to breathe aims to gather the support of 20,000 children from four target cities (starting with Beijing, Delhi, London, Los Angeles) - in support of a call to the UN to acknowledge Children's Right to Clean Air. Students will have the opportunity to join a virtual event in November to hear the response from the UN.



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Notes for educators:

- See powerpoint slides' notes section for additional information and guidance.
- These activities are aimed at 7th and 8th grade students but could also be used by 9th and 10th grade students with differentiation by outcome.
- **Advance preparation** – print and cut cards for the debate (activity 2).
- **Next steps** - to register your student's voice – please use <https://www.blueair.com/us/freedomtobreathe.html> and send a selection of any work your students do to freedomtobreathe@ccair.org (e.g. poems, stories, drawings, letters etc.). Remember to anonymise this for safety considerations.





Freedom to breathe

What do you
know about
air pollution?

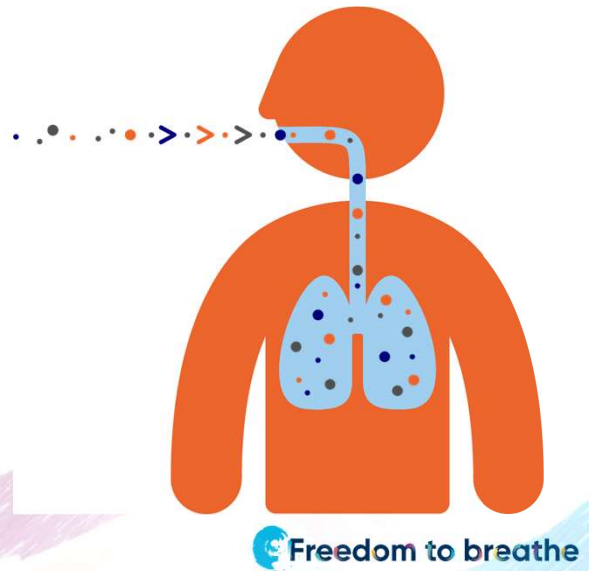


 Freedom to breathe

Air pollution is in the air that we breathe in.

The particles and gases enter our bodies and can damage our health and physical and mental development.

Air pollution can be indoors and outdoors...



Clean air is important as we need to breathe in order to survive! Even in our sleep we are breathing. Sadly sometimes we may breathe in polluted air.

Read slide

Air pollution and the particles that we breathe in are often very small and most of the time, you can't see them at all. They are quite often smaller than a single piece/strand of your hair!

For more information on indoor air pollution see the USC Study of Children's Health one of the largest and most detailed studies of the long-term effects of air pollution on the respiratory health of children

<https://healthstudy.usc.edu/>

Indoor air pollution is caused by things like...

Cooking - gases and particles are released when food is cooked.



Chemicals in cleaning products or craft materials, that are released into the air. These harmful gases are called volatile organic compounds (VOC).



Personal care products like shower gels and body sprays also release VOCs.



Dust, mould and bacteria.



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Indoor air is often more polluted than outdoor air. Indoor air pollution can be on average 2-5 times more polluted than outdoor air, due to the wide range of indoor pollutants and limited air flow.

For more on indoor air pollution, visit the California Air Resources page on indoor air pollution at <https://ww2.arb.ca.gov/our-work/topics/indoor-air-quality-exposure>

Outdoor air pollution is caused by things like...

Vehicles such as cars, vans, trains, ships and planes release gases (e.g. nitrogen dioxide & carbon monoxide) and particulate matter (in soot) into the air.



Factories that make things such as food, clothes and toys and **power stations** that generate energy by burning fossil fuels, release harmful gases and particulate matter.



Farming often has a lot of animal waste and uses fertilisers and pesticides (chemicals) to help food grow, all of which can cause pollution.



Burning fuel such as wood and coal to heat homes releases harmful gases and particulate matter.



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For more information on where air pollution comes from in the US – please visit:
<https://ww2.arb.ca.gov/resources/sources-air-pollution>

The particles in the air are called particulate matter (PM)

The air carries some **tiny tiny tiny tiny** particles, so we can't always see them!

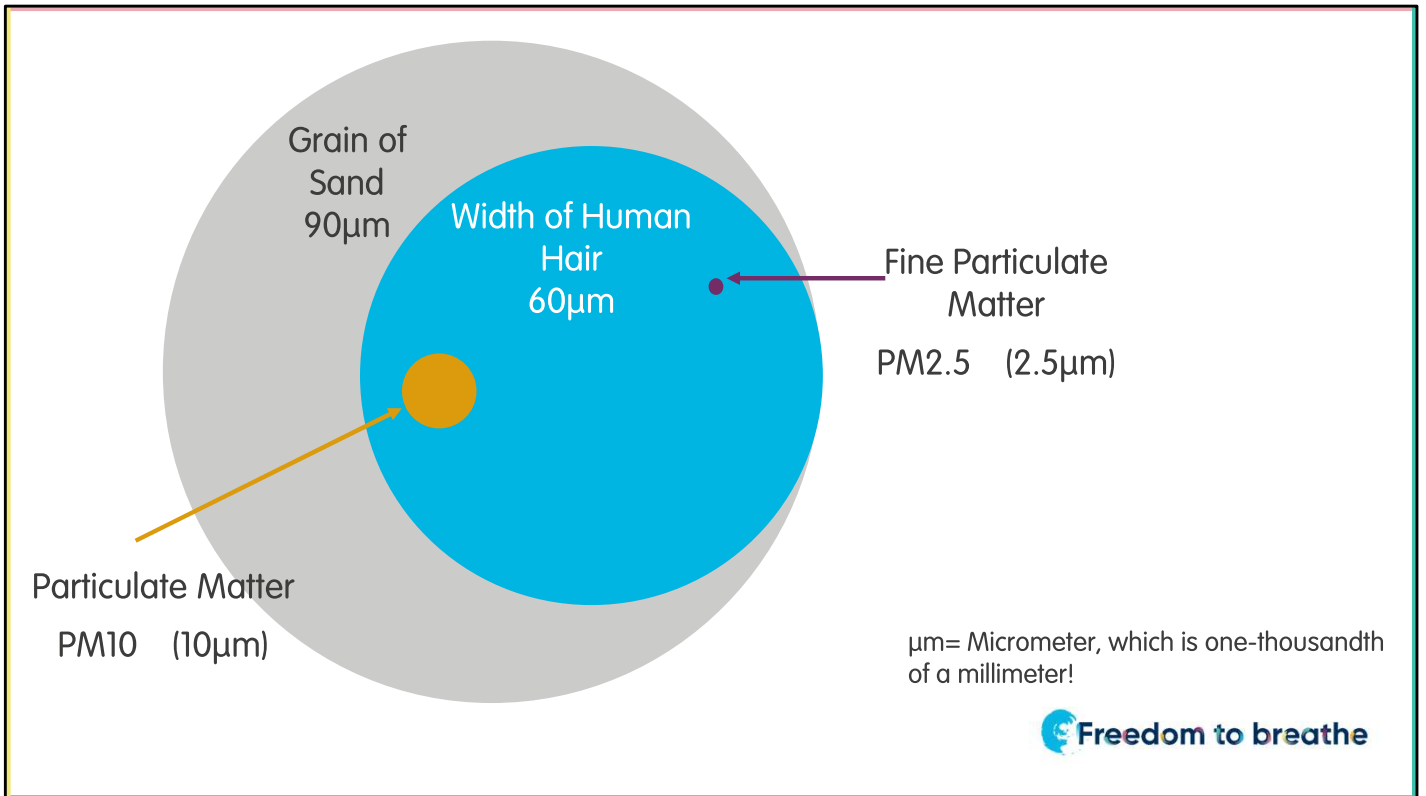
Some particles, known as **PM10**, are **10 times smaller** than a grain of sand!!

Even smaller are **PM2.5**, which are **40 times smaller** than a grain of sand!

PM = Particulate Matter



Draw attention to air pollution often being invisible



Micrometre, one-thousandth of a millimetre!

Nose hairs and lungs act as our natural filters/particle traps - but the smallest sneak through to our blood stream – again reiterate air pollution isn't always visible

Particles all around us?

Examples of PM10

Sea Salt
Pollen
Heavier dust
Mould
Bacteria



These are quite irritating! They can cause hay fever, sneezing and coughing.

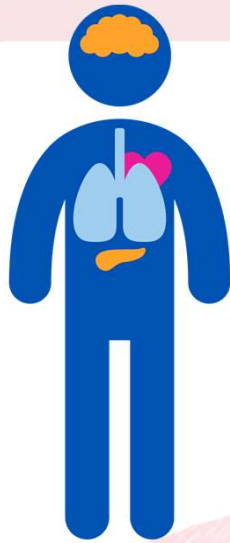
Examples of PM2.5

Soot
Cat allergens
Viruses
House dust mite
Tobacco smoke

These can seriously damage our health and development – especially our brains, hearts and lungs!

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Particles can be indoors and outdoors



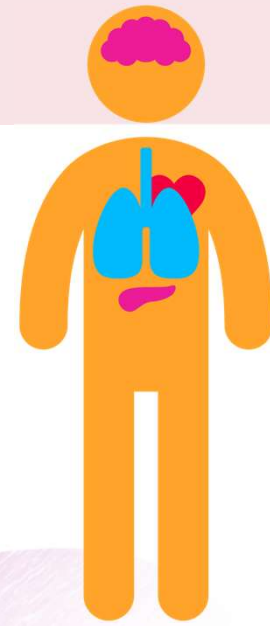
Any amount of air pollution can be damaging to our health and physical and mental development, but the more that you are exposed to, the bigger the risk and the larger the impact it can have.



Read slide

Air pollution is often very small and most of the time, you can't see it at all. It's smaller than a single piece/strand of your hair!

Can you think of ways that air pollution might affect your physical and mental development and health?



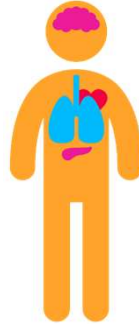
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Students to discuss and share any ideas / prior knowledge. Perhaps they know of a way in which air pollution affects them personally, or someone they know?

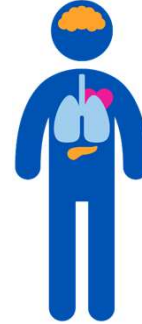
How does air pollution affect us?



Air pollution can damage your **lungs**. It can impact your breathing, can cause respiratory diseases (e.g. asthma) or make symptoms worse.



Exposure to air pollution can affect your **brain** and therefore your ability to **learn** and your **mental health**. There is also emerging evidence on the link between air pollution and worse cognitive functions, such as memory, and increased risk of dementia.



Air pollution can impact your **heart**. It causes heart disease and other coronary (heart) related problems. Every year, air pollution is estimated to contribute towards up to 36,000 deaths in the UK .

 **Freedom to breathe**

Additional information:

Polluted air is the number one environmental risk to humans. It affects all bodily functions / organs and therefore health and development. Children's bodies are more susceptible to this as they are still growing. Breathing in clean air is vital to help children live long healthy lives and realise their full potential.

In Los Angeles...

- Has been ranked for having the worst air pollution in the United States many years in a row.
- The amount of PM 2.5 in the air is high. This type of air pollution can seriously damage our health and development – especially our brains, hearts and lungs!
- More than 900,000 children are diagnosed with asthma in LA County.
- Communities near ports and industrial areas often have higher levels of PM 2.5 than others.



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Additional links / information for teachers:

For real time information on particulate matter near your school, visit
<https://www.ccair.org/clear/air-quality-monitoring-network/>

In Los Angeles, USA, $12.7\mu\text{g}/\text{m}^3$
1/10 children are diagnosed with
asthma.

Other cities also have high levels of
air pollution:

In Beijing, China, $42.1\mu\text{g}/\text{m}^3$
A 2009 study found that 6.3% of

urban children were diagnosed with asthma and 7.2% wheezing symptoms. Schools have also been ordered to keep children indoors to avoid high levels of air pollution.

In **Delhi**, India, $98.6\mu\text{g}/\text{m}^3$

A report showed that about half of the 4.4 million children who reside in the city have damaged lungs.



In California...



7 OF 10

most ozone-polluted cities in the U.S. are in California



1 MILLION

annual California student school absences related to air pollution



4 TIMES AS LIKELY

Californians are to experience serious air pollution-related health problems

Page

 **Freedom to breathe**

What do you notice about PM 2.5 levels around the world? Why does this matter?



Beijing, China

42.1 $\mu\text{g}/\text{m}^3$



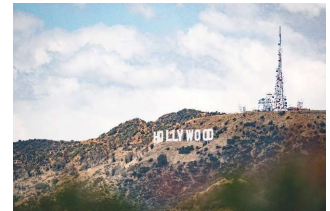
Delhi, India

98.6 $\mu\text{g}/\text{m}^3$



London, UK

11.4 $\mu\text{g}/\text{m}^3$



Los Angeles, USA

12.7 $\mu\text{g}/\text{m}^3$

$\mu\text{g}/\text{m}^3$ = micrograms per one cubic meter of air

The safe limit is 10 $\mu\text{g}/\text{m}^3$.



Additional links / information for teachers:

https://www.cdc.gov/asthma/most_recent_data_states.htm

In 2019, it was recorded that there PM2.5 levels were at 12.7 $\mu\text{g}/\text{m}^3$ (micrograms per one cubic meter of air) in **Los Angeles**. The World Health Organisation's target is 10 $\mu\text{g}/\text{m}^3$.

Other cities (Beijing, Delhi, London) also have high levels of air pollution:

In London, England, 11.4 $\mu\text{g}/\text{m}^3$

A nine-year-old girl who died following an

asthma attack has become the first person in the UK to have air pollution listed as a cause of death

<https://www.bbc.com/news/uk-england-london-55330945>

In Beijing, China, $42.1\mu\text{g}/\text{m}^3$

A 2009 study found that 6.3% of urban children were diagnosed with asthma and 7.2% wheezing symptoms. Schools have also been ordered to keep children indoors to avoid high levels of air pollution.

In **Delhi**, India, $98.6\mu\text{g}/\text{m}^3$

A report showed that about half of the 4.4 million children who reside in the city have damaged lungs.

What can we do to make sure we have cleaner air?

We can all help to make sure the air around us is cleaner.

Can you think of some ideas?



We can all play a role to make sure we have cleaner air!

At home...



- Open windows to let the fresh air in – especially when
 - cooking
 - or cleaning



- Use fragrance-free milder cleaning and personal care products.

When travelling to places...



- Walk, cycle, scoot or take public transport whenever you can instead of using your car.



- Don't idle – ask your parents/adults to turn off their engines when the car isn't moving.



Here are a few examples – remember that the air we breathe is all around us – indoors and outdoors.

What can you do to make sure we have cleaner air?

What can we do to make sure we have cleaner air?

What can everybody do to make sure we have cleaner air?



Remember, everyone can play a role in making sure we have cleaner air around us.

Have a think about what you can do, what we can do and what everybody can do.

Maybe you could have walked, or cycled, or even used a scooter instead of taking a car? (these things can flash up?)

Maybe take public transport instead of a car?

Maybe stop idling?

Open windows when cooking to let fresh air in, and close windows when there are lots of cars outside?

How can we raise awareness at a school / local / national level?

How can we get the right people listening to us?



California Clean Air Day asks everyone to come together to do at least one thing for clean air on one day based on the actions they committed to at cleanairday.org.



To get involved in California Clean Air Day, you could take the clean air pledge for kids!

www.cleanairday.org/pledge/kids/

CLEAN AIR PLEDGE FOR KIDS



Bike to school, the store or a park



Plant a tree



Tell my parents to turn off the car when idling



Walk to school, the store or a park



Tell my parents to turn off the car when idling



Give a report to my class on the environment



Grow a seed or plant a garden



Give a report to my class on the environment



Do an air quality experiment



Make a craft or art project about air quality to raise awareness

Page

 **Freedom to breathe**

Have students visit
www.cleanairday.org/pledge/kids/
To take the pledge

Activity 1: Design your own 'clean air future' vision

- Using the information from today's lesson and your own research, design your own clean air vision for the future.
- **Some things to think about to help you come up with ideas:**
 - Why clean air is so important for your physical and mental development and health
 - What we can all do to make sure we have cleaner air, both indoors and outdoors
 - What the air quality is like in your city now (both indoors and outdoors)
 - How and why you'd like this to change in the future
 - Who can help, to make sure we all have cleaner air
 - What a great clean air future vision would look/be like for you
- **You can present your work in the way that inspires you the most. For example, you could choose to do:**
 - A written piece e.g. real/fictional letter, poem, song, story, personal account...
 - A visual piece e.g. artwork, photos, videos...



Please share examples of students' work with us via email:
freedomtobreathe@ccair.org

Please ensure any work shared does not contain images of people and students are only identified by their first name / age e.g. Luke, age 12, Pasadena USA or 8th grade student, age 14, Wilmington USA

Activity 2: What solutions exist around the world?

You are going to have a class debate to help you find out more about different types of solutions that exist around the world!

Debate:

- What is the most effective way of making sure your city has cleaner air?
- Which action(s) will you prioritise?



Role play debate – use the role play cards for this – download available here: <https://www.cleanairstay.org/role-play-freedom-to-breathe-us-final/>
these will need to be cut up in advance

Scenario:

Students will be given information about a real-life example of an action taken to improve air quality in a city, together with the consequences of the action. They will read their card, identify what type of action it is from the table on slides, and debate with the class:

- What is the most effective way of making sure your city has cleaner air?
- Which action(s) will you prioritise?

The aim of the debate is to:

- Help students realise that a multitude of approaches would be most effective to make sure their city has cleaner air.
- Recognise that whilst they might not be able to implement all the actions, they can influence others and gain support from decision makers to create a city with cleaner air
- Help young people feel empowered to be agents of change

Debate!

- You each have a short description of an action that can help us have cleaner air. Some of you may have the same one.
- Read the information and then share it with your partner.
- Then get ready to share it with the class.
- Persuade your class by explaining why you think this is the best action for a city to take.
- Listen closely to others and their ideas, they might persuade you!



Role play debate – use the role play cards for this – these will need to be cut up in advance

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What type of action did you have?

<p>Legislation (laws) and advice, e.g.:</p> <ul style="list-style-type: none"> - Government - United Nations 	<p>Financial incentives and penalties, e.g.:</p> <ul style="list-style-type: none"> - Charges to travel on certain roads (penalties) - Fines for businesses who are high polluters (penalties) - Giving people money towards more sustainable transport such as bicycles (incentives) 	<p>Changes to infrastructure, e.g.:</p> <ul style="list-style-type: none"> - Cycle lanes - Better ventilation systems in buildings - Improving public transport - Digital solutions to help people travel more sustainably - Schools and businesses making it easy and safe for people to travel sustainably (e.g. bike parks) - Schools working with the council to have school streets
<p>Innovations in transport, e.g.:</p> <ul style="list-style-type: none"> - Electric and low emission vehicles - New alternative low polluting transport systems 	<p>Behavior change, e.g.:</p> <ul style="list-style-type: none"> - Walking, cycling, scooting to school or work - Choosing chemical and fragrance-free cleaning and personal care products - Opening windows, especially when cooking and cleaning 	<p>Campaigning, e.g.:</p> <ul style="list-style-type: none"> - Raising awareness with others - Signing a petition - Asking leaders in schools, businesses and the local community to come together to help tackle air pollution - Calling on the organizations like the UN to make changes that will benefit all



Students to become familiar with the idea that there are a multitude of approaches and strategies to make sure a city has cleaner air

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What are the best actions? Why? Which solution(s) can you influence? How?

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Students to identify that a mix of solutions is usually most appropriate and that they can influence these by changing their own behaviors and campaigning for change at an organizational (schools, businesses), local (city council, businesses, community, civil society), national (government, businesses, community, civil society) and international (e.g. UN) levels.

Remind students that they can be agents of change!

Debate!

- What is the most effective way of making sure your city has cleaner air?
- Which action(s) will you prioritise? Why?



Together, we can work
towards having cleaner air.

Let's think about how else we
can do that...



The Clean Air Act established the Environmental Protection Agency in the United States. In 1970, when signing an amendment to strengthen the law, former President Richard Nixon said “Clean air, clean water, open spaces - these should once again be the birthright of every American.”

Who can you tell about cleaner air?

- Who influences you?
- Who can you influence?
- How far can you reach?

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Talk to your peers etc, spread the message

Get students thinking about how their voices can be amplified with the support of trusted adults. Depending on their age (and parent/guardian permissions etc), they may also be able to use platforms (eg social media, local community groups etc) to bring people together and amplify their views and opinions.

Whose job is it to protect your air?

What do you think those people should be doing to protect your clean air?

Do you think they are doing what they should be doing?



The Clean Air Act established the Environmental Protection Agency in the United States. In 1970, when signing an amendment to strengthen the law, former President Richard Nixon said “Clean air, clean water, open spaces - these should once again be the birthright of every American.”

1. Have students identify their local air district
2. Have students do a power-agency identification chart
 - a. If a railroad train passing through LA is polluting the air, who has jurisdiction?
 - California Air Resources Board (CARB)
 - South Coast Air Quality Monitoring District (SCAQMD)
 - Environmental Protection Agency (EPA)
 - United Nations (UN)

Some citizens report that a textile manufacturing factory in their neighborhood is emitting black smoke from its smokestacks, which agency will go and investigate? CARB, SCAQMD, or the EPA

One important thing we can do is to make sure that Clean Air becomes an explicit right!





The UNCRC is part of the UN human rights and focuses specifically on the rights of a child.

It is the most complete statement of children's rights ever produced and is the most widely-ratified international human rights treaty in history.

There are 54 articles that cover a child's life. It explains how adults and governments must work together to make sure all children can enjoy all their rights.

Explain the UNCRC Article 24

Article 24

1. States Parties recognize the right of the child to the enjoyment of the highest attainable standard of health and to facilities for the treatment of illness and rehabilitation of health. States Parties shall strive to ensure that no child is deprived of his or her right of access to such **health care services.**
2. States Parties shall pursue full implementation of this right and, in particular, shall take appropriate measures:
 - (a) To diminish infant and child mortality;
 - (b) To ensure the provision of necessary medical assistance and health care to all children with emphasis on the development of primary health care;
 - (c) To combat disease and malnutrition, including within the framework of primary health care, through *inter alia*, the application of readily available technology and through the provision of adequate **nutritious foods** and **clean drinking-water,** taking into consideration the dangers and risks of **environmental pollution;**
 - (d) To ensure appropriate pre-natal and post-natal health care for mothers;
 - (e) To ensure that all segments of society, in particular parents and children, are informed, have access to **education** and are supported in the use of basic knowledge of child health and nutrition, the advantages of breastfeeding, **hygiene and environmental sanitation** and the prevention of accidents;
 - (f) To develop preventive health care, guidance for parents and family planning education and services.
3. States Parties shall take all effective and appropriate measures with a view to abolishing traditional practices prejudicial to the health of children.
4. States Parties undertake to promote and encourage international co-operation with a view to achieving progressively the full realization of the right recognized in the present article. In this regard, particular account shall be taken of the needs of developing countries.

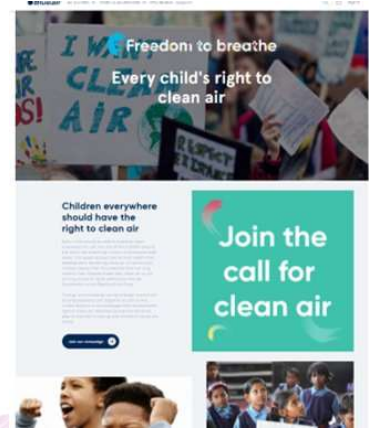
This is article 24, which highlights some of children's rights.

As you can see there are some very important things e.g. **access to hospitals, clean water, healthy food, a good and clean environment and education.**

BUT something that is not explicitly stated is the right to Clean Air

The UNCRC does not explicitly state Clean Air should be a right.

- Do you think it should?
- Raise your hand if you agree.
- Your teachers will make sure that the right people know you think clean air should be a clear right, by adding the number of children who voted 'yes' to <https://www.blueair.com/us/freedomtobreathe.html>



 Freedom to breathe

Raise a hand if you think it should - call to action and explain the campaign (see next slide for more notes)

What happens next?

- 20,000 children calling for the Right to Clean Air all over the world – starting in Beijing, Delhi, London & Los Angeles!
- Event in November bringing together the children's voices to the UN
- Your ideas are really important – we'd love to know what they are so we can help you share them with the UN! Examples might include:
 - Stories, poems, letters, songs
 - Artwork
 - Videos or photography (of actions and places, not people)

Please ask your teacher to share your work with us via email:
freedomtobreathe@ccair.org



Freedom to breathe aims to gather the support of 20,000 children from four target cities (starting with Beijing, Delhi, London, Los Angeles) - in support of a call to the UN to acknowledge Children's Right to Clean Air.

Students will have the opportunity to join a virtual event in November to hear the response from the UN.

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Freedom to breathe