Educator pack

For engagement practitioners, teachers, and young people working for a clean air and net zero carbon future

ClairCity

EDUCATOR DECISION HELPER

Use our nifty decision tree to navigate this pack

HOW OLD ARE THE AUDIENCE?

4-10 — **11-14** — **15+**

4-10: How long have you got?

1 HOUR
Head to pages 10-15

A FEW LESSONS
Head to page 2

I'M FLEXIBLE

11-14: How long have you got?

1 HOUR
Head to pages 17-30

A FEW LESSONS
Head to page 2

I'M FLEXIBLE

15+: How long have you got?

1 HOUR
Head to page 34

A FEW LESSONS
Ask them to deliver some lessons to younger people, using resources in this pack

I'M FLEXIBLE

Develop a themed curriculum (page 2) or take part in the clean air future competition (page 17)

For a clean air and net zero carbon future

Foreword

How do you want to live, work, and travel in your city of the future?

That's the question we asked citizens across Europe in this four-year long research project. ClairCity was an EU research project which aimed to raise awareness about air pollution and carbon emissions in our cities, looking at how we all contribute to the problems and how they affect the air we breathe. Uniquely, the project put the power in the hands of residents to determine the best local solutions.

Carbon emissions and air pollution: two sides of the same coin

While the effects of poor air quality are felt worldwide, the sources are usually local. Every day, air pollution and carbon emissions are produced by our commutes to work, by heating our homes, or through our daily lifestyles. Understanding how we live - and the restrictions we face in those choices – is key to improving air quality. Solutions at a local level can make a big difference.

The activities polluting our air are also the same ones producing carbon emissions – the major cause of climate change. Reducing carbon emissions in cities is critical to achieve major cuts in carbon globally, so reducing climate risks. The EU now has a target of reaching net zero carbon emissions by 2050, with action urgently needed to improve the health of citizens and the environment.

Children are the future

Engaging young people on these issues is critical - they are future voters, after all. Many young people want to be heard and it is the responsibility of older people to give them a platform to voice their opinion.

Throughout the ClairCity process young people were involved. In fact, 1000s of young people across Europe got involved through our various schools activities and public events. And 447 of those young people took part in our schools competition: My City, My School, My Home!

The resources contained within this pack are the result of the collective effort of our partner organisations in Amsterdam, Aviero region, Bristol, Ljubljana, Liguria region and Sosnowiec, and the many young people that tried and tested them. While they are aimed primarily at professional educators and UK schools, anyone from across Europe who wishes to work with young people can benefit from the materials. Teachers value lesson support and delivery from civil society organisation so this pack is also aimed at organisations wishing to partner with educators on these pressing issues.

We hope these resources will go on to benefit many more 1000s of young people, empowering them to lead the way towards a clean air and zero carbon future!

Content

LP = lesson plan!

Working with young people

Do you or your organisation wish to talk to young people but perhaps don't know how? Maybe you're a young person yourself, hoping to inspire peers to act.

Working with young people is challenging yet rewarding. There are different learning styles and needs to attend to, and you'll have to consider the curriculum or learning objectives of the group(s) you wish to engage.

First step, partner with schools, youth groups or community organisations

Reach out to organisations who work with young people that you would like to engage. Think about places that may be the most impacted by these issues and go there!

Let them know you have lots of resources and you can adapt to the needs of the school. Some may specialise in oratory skills, others in digital technologies or leadership. Be willing to be flexible! Take time building these relationships and meet face-to-face where possible.

Set clearly defined expectations

What can you realistically offer and deliver? And what are the expectations of the partner organisation? Start small, and over time, once relationships have built, increase your offering.

Seek out opportunities to engage

If you wish to go somewhere other than schools, find events where you can engage broadly with a lot of people (school fetes, holiday clubs, kid-friendly festivals, assemblies) and more intimate events where you can engage deeply with fewer people (e.g. youth groups, workshops).

Test out resources

We have provided a suite of resources in this pack to help you when engaging young people. They include curriculum links and subject themes that will be useful when approaching teachers. Most have been tried and tested, however you may need to adapt for your context - so if possible, test with a few children first. Perhaps a friend's kids? Ask for their feedback and refine as required.

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Themed curriculum

We have produced resources for primary and secondary schools that can be used as standalone sessions or as part of a themed curriculum. The materials cover a broad range of subjects, from art, science, information technology, Personal, Social, Health and Economic (PSHE) education to citizenship, and allow students to step out of the classroom and into real world decision-making about issues that matter to and affect them.

A themed curriculum allows students to contextualise learning and gain a deeper understanding of the issues.

Begin with the Air Pollution Assembly that accompanies this pack to introduce students to the broad issues and use our FACT SHEET on page 4 to support the discussion.

Now that they understand the basics of the topic, children can be involved in the development of the theme. The resources in this pack can be chosen by the students or selected by the educator to help spark curiosity and support the children's learning.

FACT SHEET
Air pollution, carbon emissions and our health

What is it?

Air pollution includes **gases** and **solid particles in the air**. The air pollution that most affects our health in Europe is nitrogen dioxide (**NOx**) and Particulate Matter (called **PM2.5** and **PM10**).

Why is it a problem?

Air pollution leads to many health problems and is linked to **4.2 million premature deaths each year**. It affects three core areas of the body: **lungs**, **heart**, and **brain**. Lower birth rates, strokes, and heart failure are among the health impacts of air pollution.

Children can suffer from **reduced lung development** if they live or go to school in areas with higher air pollution. Air pollution is also linked to **reduced brain development** in small children. Some of the same health problems will be felt by animals like our pets too.

Air pollution affects plant and tree growth. Nitrogen dioxide is linked to **acid rain** which damages plants, trees and buildings. Buildings in polluted areas can also end up with more **black soot** on them, meaning we have to clean our windows more often.

What causes air pollution?

Across Europe, **traffic** is a major cause of air pollution, especially NOx. This comes from **diesel and petrol engines**, with diesels being worse. Even though bigger vehicles (e.g. buses and lorries) produce slightly more of the gas, when you have lots of cars on the road this can cause a bigger proportion of the air pollution. Is it better to have 76 cars driving to the shops, or one bus? The bus is definitely not producing 76 times more pollution!

Particulate matter is also emitted by traffic – some coming out of the engine, but also from the **friction of tyres** on the road and from **braking**.

Pollutants also come from home heating, including **wood burning stoves** and **fireplaces** and some types of **industry**.

Why is it worse in some areas?

Air pollution is caused by a combination of factors. The first is how much air pollution is being emitted: the number of vehicles on the road, or number of fires nearby, etc. However, the level of air pollution can also depend on how much the air is circulated or where the wind carries it. So higher, windier places will tend to have less pollution, but low-lying places, or narrow roads with very tall buildings may have worse pollution. As a rule of thumb, if you can see lots of vehicles then the air inside the cars and on the pavement is probably not great.

In Europe, we only rarely have extremely high levels of air pollution, but this is common in other countries especially in China and India. However, we are not perfect either. Even though our levels might not get as high as levels in some cities, **we have chronic low level pollution in many European cities and towns which can lead to long term health impacts,** causing people to have more illnesses and die earlier. Currently, **most cities in Europe are breaking the law** because we pollute too much.

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FACT SHEET
Air pollution, carbon emissions and our health

How can we protect ourselves?

Here are just a few ideas. Ask your students to come up with their own suggestions.

Reduce the causes
How can we use cars less? Can we walk, **cycle, bus or scoot** around and play in places nearby so we don't need to use cars as much? Could your school run a "**No Idling**" campaign for drop-off times?

Avoid busy roads
Walking on smaller, quieter roads or through parks will significantly reduce the amount of pollutants you breathe in.

Stop idling and drive carefully
Even inside a car, you are still breathing in polluted air. In other words, you are no less protected than if you were walking or cycling. By switching off the engine when possible and avoiding strong acceleration and braking, you are reducing the amount of air pollution you are creating.

Get talking
Spread awareness of the issue. Speak to children and young people, politicians, neighbours, parents, businesses... we can all play our part in tackling this problem together so no one is left behind.

Hang on, what about carbon emissions?

For many people living in European cities, climate change doesn't appear to impact them. They might think our house isn't burning yet.

Carbon Dioxide (**CO_2**) is the most common greenhouse gas, so called as they trap heat in the planet, warming it like a greenhouse! This heating is leading to biodiversity decline, sea level rise and extreme weather, like droughts and heatwaves, that cause crops to fail and increase the likelihood of forest fires.

Air pollution differs from greenhouse gas emissions in that it consists of short-term pollutants that persist for just a few weeks. However, its sources are the same. For example, the transport sector is the fastest growing contributor to emissions and accounts for almost ¼ of all CO_2 emissions (a long-lived pollutant). It is also a significant contributor to air pollution, particularly in cities, through the production of short-lived NOx and PM10, such as black carbon, or soot.

Despite being short-lived, black carbon is the second highest contributor to global heating, after CO_2. Diesel transport (along with household wood burners) is one of the world's major sources of **black carbon**.

Both issues interrelate. Ground-level **ozone** pollution, produced when fossil fuel pollutants react with ultraviolet light, is on the rise and will worsen as temperatures rise with climate change.

As air pollution is localised and immediate it overcomes the disconnect people may feel towards climate change. as it is local and immediate. Thus, focusing campaigns on air pollution reduction could do more to tackle climate change than climate change campaigning in and of itself.

See back of pack for actions schools can take!

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Did you know...

air pollution contributes to respiratory tract infections that resulted in 543,000 deaths globally in children under 5 years in 2016.

*www.who.int/ceh/publications/air-pollution-child-health/en/

Ages 4-10

Lesson plan: Pollution solution

Objective: make air pollution visible and take action

Duration: 60m
Theme: Transport, environment, society
Subject focus: Science
Age: 4-10

Learning outcomes

MUST: Visualise air pollution, debate the issues and come up with sollutions
SHOULD: Understand how to conduct a scientific experiment
COULD: Create an additional bottle for the school or somewhere of their choosing

Starter

When we look around, we do not usually see the 'air' so it is easy to assume that our air is clean. In reality, the air and the pollution in it are made up of mostly invisible gases. Pollution particles are so small that we cannot see them. This means that it is hard to know if the air we breathe is clean or polluted.

By visualising this big problem, students can begin thinking about what they can do about it. This experiment will help you discover how we can test for air pollution.

Main activity

1. Hand out two containers of water to each table. One labelled 'Busy road' and one labelled 'Park'
2. Ask students to make a hypothesis about whether a busy road or a park would be more likely to be polluted
3. Use a teaspoon/pipette to add 10 drops of 'reagent' to each container
4. Watch for a reaction when reagent is added to the sample
5. Ask class: Which bottle is polluted and which is not? Why do you think this? Was your hypothesis correct?

Plenary

Ask: What do you think are the biggest causes of air pollution in our area? Are the causes of carbon emissions the same? Can you think of any solutions? What would our city/region look like if we eliminated the source of emissions?

Resources required

- Bicarbonate of soda dissolved in water ("pollution")
- Red grape juice ("reagent")
- Droppers/spoons
- Sticky labels
- Paper
- Pen or pencil for recording ideas

Before the class

- Make 2 samples in litre bottles: (A) neutral (just water) and (B) polluted (2-4 tsp of bicarbonate of soda).
- Label (A) 'Park' and (B) as 'Busy road'.

Curriculum links

- Asking relevant questions and using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative and fair tests
- Reporting on findings
- Using results to draw simple conclusions
- Using straightforward scientific evidence to answer questions or to support findings

Downloads:

bit.ly/BSAPrimary2019

Lesson plan: Traffic survey

Objective: organise, represent and interpret data

Duration: 60m
Theme: Transport, environment, society
Subject focus: science
Age: 4-10

Learning outcomes

MUST: Use a tally to locate data
SHOULD: Use collated data to review findings and answer key questions
COULD: Compare two locations or times of day and draw conclusions

Starter

Recap: Where does air pollution come from/what causes air pollution? Encourage children to link the issue to traffic and make the link that the busier the road the greater the amount of pollution. As a class, decide which road(s) to study; consider visiting the same road twice at different times or two different roads for a comparison.

Main activity

Prior to the visit, agree duration of visit and how data will be recorded. Will it only be traffic or pedestrians too? Could some groups focus on a specific direction, collect photo and video evidence, interview passers-by about how they feel about the local traffic issues? Prepare tally sheets or use pre-prepared booklet.

On return to the classroom, support the children to record their findings in table/graph form as required.

If the children need a reminder about data handling techniques consider using: bbc.co.uk/education/topics/z7rcwmn

Plenary

Study findings: What were the most common type of vehicle? Was there anything we didn't see? When do you think the road is busiest? What did the people you spoke with say?

Resources required

- Google Earth (if possible)
- Clipboards
- Camera (if possible)
- Stopwatches
- Air Pollution data log for each child/team (overleaf)
- Adult supervision near roads
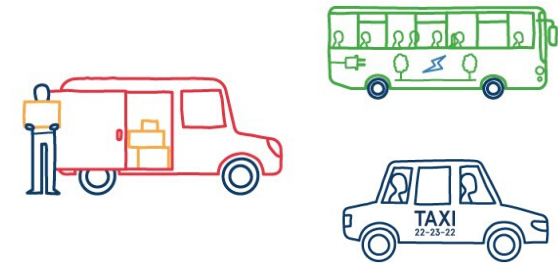
Curriculum links

- Interpret and construct simple pictograms, tally charts, block diagrams and tables
- Ask and answer simple questions by counting the number of objects in each category and sorting by quantity
- Ask and answer questions about totalling and comparing categorical data
- Interpret and present discrete and continuous data using appropriate graphical methods
- Solve comparison, sum and difference problems using information presented

Air pollution data log

Travel type	Frequency
Car	
Bus	
Lorry	
Van	
Motorbike	
Bicycle	
Pedestrian	

Describing our data....

STOP AND THINK

If 7 cars pass in 10 minutes, how many cars might pass in one hour?

Do you think the same number of cars pass every day of the week? What about at different times of the day?

What I see...

How this feels to me....

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Lesson plan:
Clean Air Top Trumps

Objective: act for clean air and fewer carbon emissions

Duration: 60m
Theme: Transport, environment, society
Subject focus: PSHE, Citizenship
Age: 7-10, 11-15

Learning outcomes

MUST: Play Top Trumps and vote
SHOULD: Create four additional cards illustrating potential travel solutions

Starter

We have a BIG problem to solve - designing a future with clean air and fewer carbon emissions. Air pollution is linked to 4.6 million deaths each year. Carbon emissions could change our way of life forever through global heating.

Your mission is to think about and compare a range of different solutions, voting on priorities for change. Think quietly about: What is air pollution? Where do emissions come from? What causes air pollution and carbon emissions? Each city has different challenges (e.g transport, heating).

So, what can we do? Share a few ideas as a class: what could we build to help us travel? What could we change in our lives? What could we teach? Encourage class to consider to be as creative as possible. In pairs, jot down at least three travel ideas as either sketches or in note form.

Main activity

Now to make use of these ideas. Ask: Does anyone know the game Top Trumps? What do we need for Top Trumps? (cards and scores). Make cards to play "Clean Air Top Trumps." Initially score one card together. Get pairs to do the same. Do this three more times, emphasising the scale is a maximum of 10 (1 is low, 10 high).

Difficulty: how hard it is to do this – what skills do you need? What equipment?
Cost: how expensive is it?
Speed: how fast will journeys be?
Environmental: how much harm will this cause?

Hand out completed packs (see overleaf) so together each pair has 10 cards to play with. Play the game! If you lose all your cards, and there is time, create another.

Plenary

Which was a winner? Ask pairs to vote on their favourite by sticking a dot against their preferred option on the flipchart. Hold a class discussion about the winning solution. Discuss trade-offs - what would you have to give up? What would you gain? Is there a perfect solution for all?

Resources required

- Top Trump cards (blank and complete)
- Flipchart with numbers to represent cards, plus paper, pens and sticky dots

Curriculum links

- Making informed choices about health and wellbeing matters
- Understanding how citizens can work together to improve their area

Downloads:

http://bit.ly/BSASecondary2020

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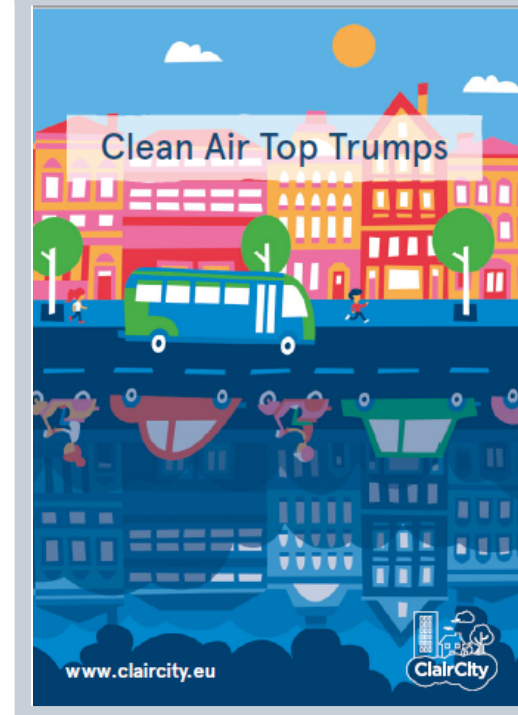
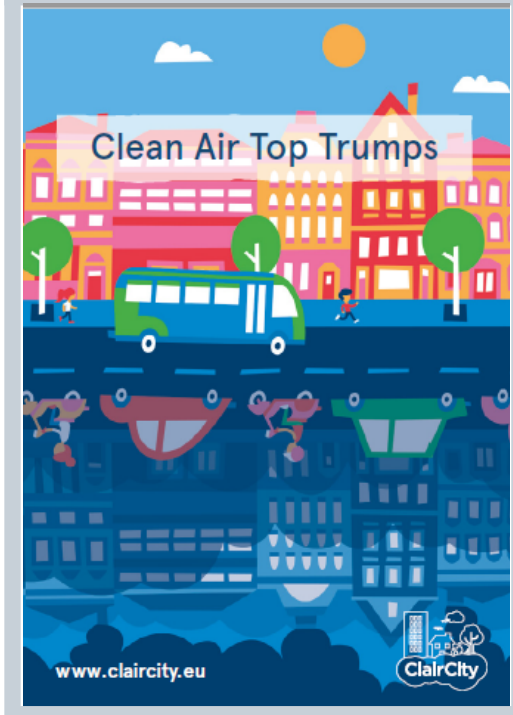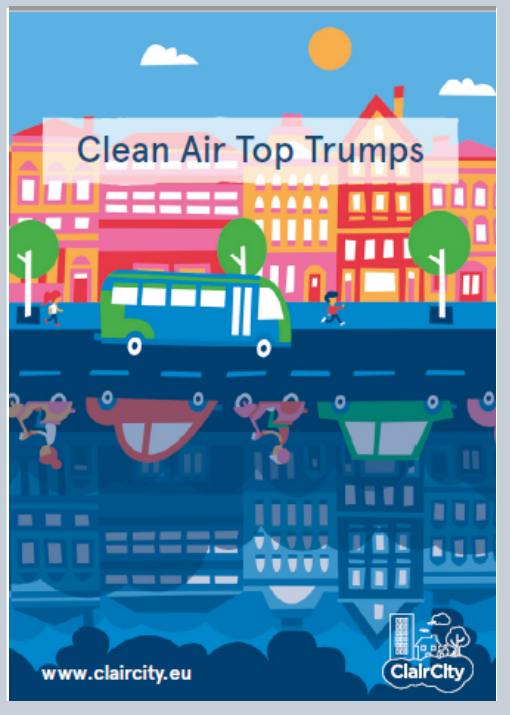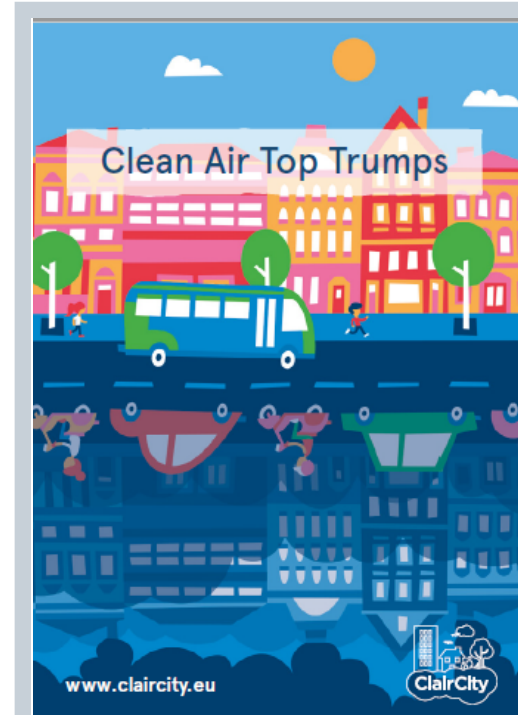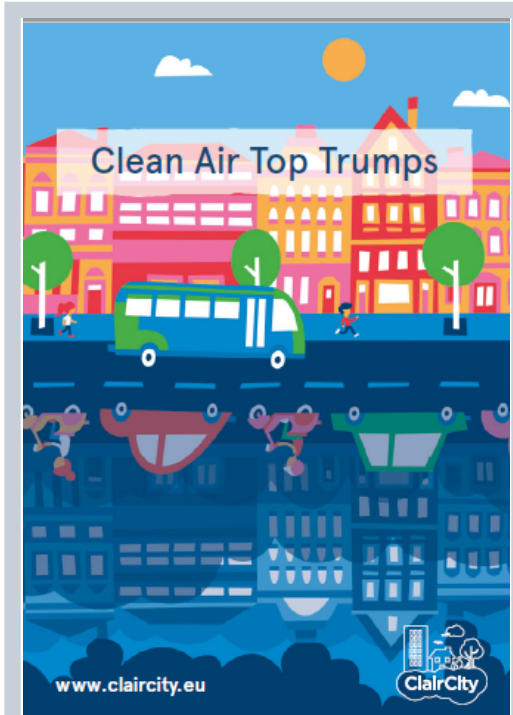## Instructions

We have the power to improve our air and our climate. Use these cards to talk through possible solutions to air pollution and climate change, and rank which solutions are the best for people and the environment.

To start the game, shuffle and deal all the cards face down. Each player holds their cards so that they can see the top card only. The player to the dealer's left starts by reading out a category from the top card (e.g. easy, cheap). The other players then read out the same category from their cards. The winner of the round is the person with the biggest number.

You can create your own cards using the blank cards provided.

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Can you find the least polluted route? Help your friends reduce their exposure to air pollution and make their way safely to school

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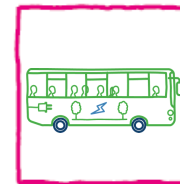
Take the bus to school, for shopping and hobbies

Easy	3
Cheap	5
Fast	5
Environment	7

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Easy

Cheap

Fast

Environment

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Easy

Cheap

Fast

Environment

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Easy

Cheap

Fast

Environment

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Lesson plan:
Persuasive letter writing

Objective: recognise and adopt a range of persuasive devices

Duration: 90m
Theme: Waste, Transport
Subject focus: persuasive writing
Age: 7-10

Learning outcomes

MUST: Contribute ideas to a group letter and support peers to use more formal phrasing
SHOULD: Produce a persuasive letter outlining key points, well balanced fact and opinion and a supporting quote.

Starter

Having completed one of the previous lessons, children can now use their expertise to make a real difference? Ask: Have you read or written a persuasive letter before?

Together decide the best audience for a persuasive letter (the Mayor? Local MP?).

Begin by watching:
www.bbc.co.uk/education/clips/zqy3qty

Ask: is the language appropriate for someone like, for example, the Mayor? Create a toolkit together to highlight the key elements of a successful persuasive text. Explore the phrasing and decide on more appropriate language choices.

Consider exploring some written examples, such as the deforestation text from www.literacywagoll.com/persuasive.html. Annotate to draw out key structure and phrases the children would like to use.

Main activity

Draft and then write the persuasive letter. Work in pairs to encourage peer review. Remind the children to refer regularly to the toolkit and to be prepared to redraft sections a number of times.

Consider a mini plenary where some children are invited to read a paragraph they are proud of, allowing others to learn from their ideas.

Plenary

1. Celebrate success: share favourite sentences, phrases or quotes. Would these letters persuade you?
2. Post the letters!

Extension tasks

- Design and make persuasive posters to display on community noticeboards, in the school newsletter or lampposts.
- Adapt the letter for different audiences and send multiple copies

Resources required

- Pre-prepared letter structure (see postcard overleaf)
- Example text (see starter)
- Whiteboard to create visible toolkit for reference throughout lesson
- Staff to support less confident writers
- Optional word bank of phrases

Curriculum links

- Plan, draft and write text and evaluate and edit objectives
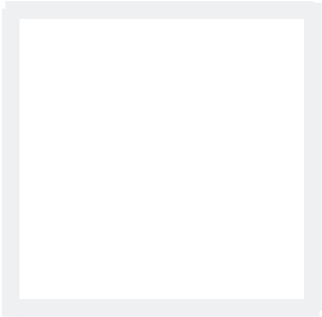
Wish you were here?

Dear ....,

We are in class........... at ....
school. Today we have been exploring air
pollution and carbon emissions and the
problems they cause.

We are writing to tell you that................................
....
....
....
....
....

We learnt that...
....
....

We would like if you could.......................................
....
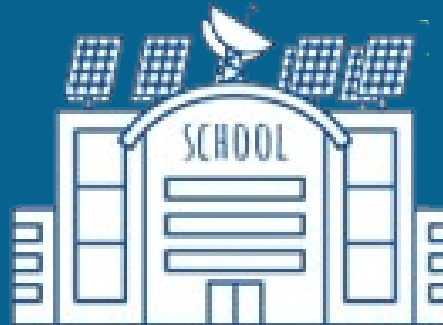..

Yours sincerely,

ClairCity

Ages 11-14 and 15+

My City, My School, My Home

Schools competition

Working in teams, young people complete a short questionnaire (example on page 19) about the look of their neighbourhood (e.g housing type, energy usage, green space). They may need some additional support to answer these questions, e.g using web searches or printed materials about the local context.

Each team then uses this information to produce a 2030 cityscape, using the 'citizens at the centre' scenario on page 22 for inspiration. Teams can choose to draw, collage, act or write their future scenario. Young people can adopt the personas of a group of people that may be influencing that kind of future (e.g. businesses, politicians, citizens). This will help with creativity and they can remain in character when presenting their future scenario to the class.

When presenting their future scenario, they must talk about the policy measures that were taken to get to this future. Some example measures are available on page 20.

After presenting, they will be scored for climate, air pollution and health (a panel of pupils or teacher could do this). By how much were the groups able to improve their city for the better? Interesting conversations can be sparked from these scores. Teams can discuss what future they want and put forward their argument along with the winning scenario to compete with other year groups, schools or cities.
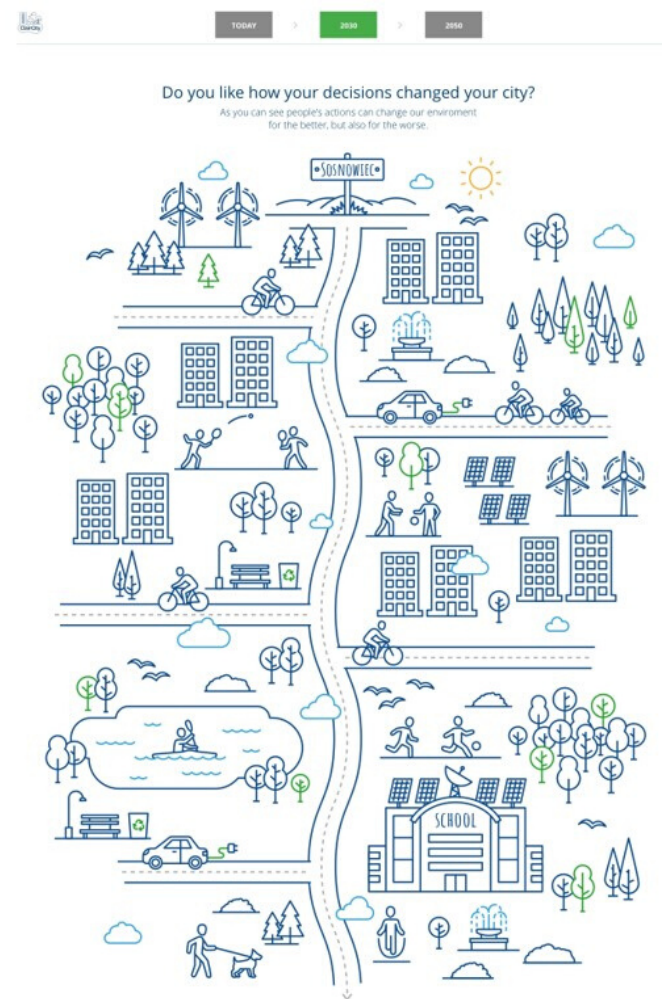
Above: A still from the digital version of My City, My School, My Home. Play online here: www.claircity.eu/take-action/schools. Produced by Peter Szuppinger and Eva Csobod, Regional Environmental Center, Hungary, Progressive Software Company (www.progressive.hu), Hungary

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My City, My School, My Health

Lesson plan overview

Lesson 1

- Introduce the issues (climate change, air pollution, health) and the competition
- Divide the young people into teams (ideally 5-7 people); come up with team names
- Discuss any questions the pupils may have

Lesson 2

- Young people to investigate the local context relevant to the issues and fill out the questionnaire

Lesson 3

- Introduce the idea of policies and their use in shaping the future. Explore in the context of the four possible scenarios on page 22
- Discuss what policy measures might be beneficial and which may be harmful to health, the air and the climate, and which might lead us towards these different scenarios

Lesson 4

- Teams are told they need to sketch, collage, write, act (etc) what they think the best case scenario (citizens at the centre) will look like in 2030 in their city/region, writing down policies that they choose to implement and reject from the list on page 21.

- (Optional) students adopt the persona of a group that may be responsible for influencing this future (e.g. developers, citizens)

Lesson 5

- Teams present their 2030 scenario, justifying their policy selection. An 'expert panel' scores each team out of 10 for the improvements they have made to the climate, air pollution and health (1 (low) - 10 (high))
- From all the presentations, class agrees on the future they want and put forward their argument why this should be the winner
- Discuss the activity with the whole class - Did you enjoy the activity? Were you surprised by anything? What were the tradeoffs? What can we do to influence this future?
- Conclude with how these discussions are relevant today

Competition element

Classes can compete for the overall winner, or different schools could compete. Teachers gather the submissions from each class/year group and decide upon the winner based on a) score from the panel, b) imagination and c) class justification as to why this is the best case scenario. Prizes could include cinema tickets or a small present donated from a local business, plus a certificate.

For non-school audiences

Repeat as suggested, or take a morning to complete the activities. Allow 3-4 hours for young people to complete all tasks.

Example list of questions

1 What type of housing is the most common in your neighbourhood (in the area you live in)?

a Poorly insulated apartment building
b Poorly insulated family house
c Well insulated family house
d Well insulated apartment building

2 How are the buildings mostly heated in the area you live?

a Gas or coal
b Wood
c Renewable-based district heating or heat pump
d Electricity

3 How much electricity is consumed by an average household in the area you live in kWh/m² per year?

a Less than 10 kWh/m²
b Between 10-20 kWh/m²
c Between 20-30 kWh/m²
d More than 30 kWh/m²

4 How do the majority of children in your school get to school?

a Car
b Public transport/school bus
c Cycle/scooter
d Walk

5 What is the number of cars per 1000 inhabitants in your city?

a Above 600
b Between 450 and 600
c Between 300 and 450
d Below 300

6 Do you see electric cars running in your city?

a Very rarely/never
b A few
c More than before
d Quite often

7 What would you consider the ambient air quality to be like where you live?

a Very bad
b Poor
c Okay
d Good

8 Is the ambient air quality regularly monitored where you live?

a No
b Yes, for weather
c Yes, for weather and some pollutants
d Yes, for weather and pollutants, including particulate matter

9 How is your school heated?

a Gas or coal
b Wood
c. Renewable-based district heating or heat pump
d Electricity

10 What type of building is your school? (If the school has more than one building/parts, you can refer to the most relevant part.)

a Old, made with concrete
b Renovated, made with concrete and external thermal insulation
c Non-refusrbished brick, constructed before 2000
d Brick, built/renovated after 2000

11 How warm is your school during the winter?

a Above 24°C
b Between 21 and 24°C
c Between 18 and 20°C
d Below 18°C

12 Does your school separate waste into different bins?

a No
b Yes, for one type of waste
c Yes for two-three types
d Yes, we even have a compost bin!

13 How much electricity is consumed each year on average in your school in kWh/m2?

a More than 30 kWh/m²
b Between 20 and 30 kWh/m²
c Between 10 and 20 kWh/m²
d Less than 10 kWh/m²

14 How much energy is used to heat the school building each year in kWh/m2?

a More than 400 kWh/m²
b Between 300-400 kWh/m²
c Between 200-300 kWh/m²
d Less than 200 kWh/m²

15 How often is your school ventilated?

a Rarely
b Sometimes
c Often
d There is automated ventilation in school

16 What would you consider the quality of the ambient air around your school?

a Very bad
b Poor
c Okay
d Good

17 Do you currently monitor quality at your school?

a No
b Yes, for some pollutants
c Yes, for most things
d Yes, students do the monitoring!

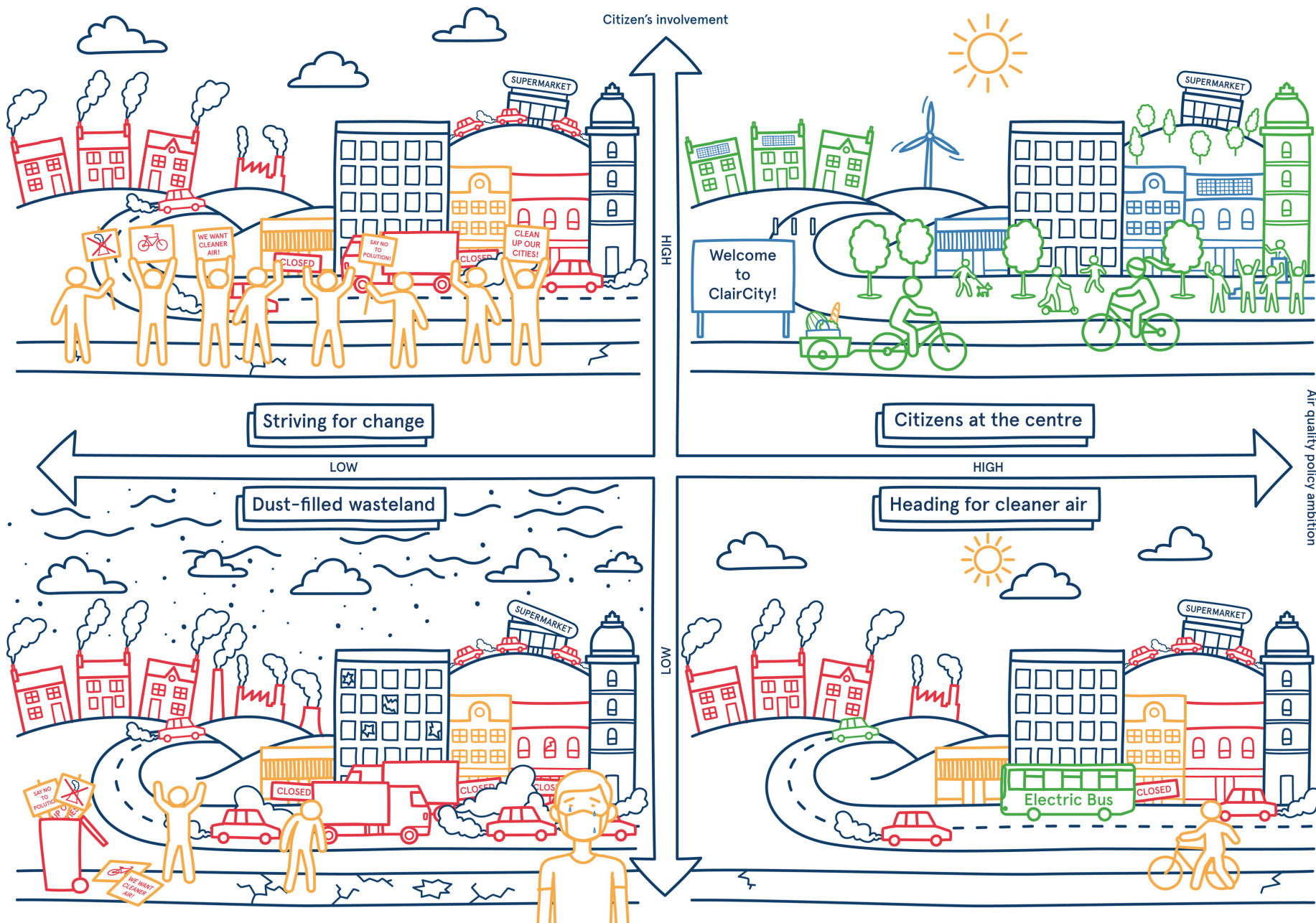**18** What is the rate of inhabitants with diagnosed asthma in your city?

a No data
b Less than 2%
c Between 2 and 5%
d Above 5%

19 Do you think your city has a good public transport system?

a No
b It's okay
c It's getting better
d It's great

Example list of measures for change

1 Create or enlarge the area in the city where the most polluting vehicles are not allowed to enter.

2 Introduce a congestion charging scheme in the city centre. In parallel create park & ride spaces at train/bus stations at the city borders.

3 Support the accelerated uptake of vehicles running on alternative fuels (hydrogen and electric) and support the establishment of the necessary infrastructure.

4 Replace old vehicles with modern ones, including regulations for buses. Or introduce a total ban on diesel engines.

5 Motivate people to commute to work/school in shared vehicles.

6 Improve public transport services to attract car drivers.

7 Provide tax benefits for employers who encourage their employees to commute by public transport, bicycle or on foot.

8 Require schools to calculate the CO2 emissions of the journey to school of teachers and pupils.

9 Reduce the speed limit in all residential areas to 30 km/h.

10 Increase the price of fossil fuels and/or increase road tolls to encourage people to drive less. The increased income will be used to subsidise public transport.

11 Reduce road capacity.

12 Develop new/better apps and software to help journey planning.

13 Organise a campaign to introduce people to the concept of fuel-efficient driving techniques.

14 Make the night-time delivery of goods compulsory in cities.

15 Make non-electric car driving inconvenient, e.g. only allowing the use of cars on alternate days or limiting the number of kilometres per person that is permitted to drive using cars run on fossil fuels.

16 Reduce car size (and the corresponding fuel consumption) by law.

17 Campaign a healthy lifestyle campaign, promoting walking and cycling in particular.

18 Restrict the use of solid fuels for domestic heating.

19 Expand and modernise district heating networks.

20 Impose a compulsory rate of renewable energy sources for domestic heating and electricity (e.g. solar panels, wind turbines and heat pumps) for new houses and refurbishments.

21 Increase the efficiency of lighting in households, official buildings and outdoors.

22 Insulate the walls and roofs of buildings.

23 Increase green spaces, imposing a provision of at least m2 per capita in cities.

24 Ensure urban planning prioritises air pollution and greenhouse gas emissions.

25 Increase the frequency of street cleaning (sweeping and washing roads).

26 Make green infrastructure such as green walls and roofs compulsory in new buildings.

27 Provide continuous and credible communication about air pollution and its health impacts in cities, and develop supporting apps.

28 Increase the efficiency of window insulation, replacing single/double glazing with triple glazing.

Citizen's involvement

Striving for change

Citizens at the centre

LOW

HIGH

HIGH

Dust-filled wasteland

Heading for cleaner air

LOW

Air quality policy ambition

WE WANT CLEANER AIR!

SAY NO TO POLLUTION!

CLEAN UP OUR CITIES!

CLOSED

SUPERMARKET

Welcome to ClairCity!

Electric Bus

Lesson plan:
Citizens' Assembly

Objective: take an active role in citizen decision-making

Duration: 90m
Theme: Waste, Transport
Subject focus: Citizenship
Age: 7-10

Learning outcomes

MUST: Contribute to group discussion, understand more about policy making and vote on their priorities

SHOULD: Debate different policy measures and discuss trade-offs

Starter

1 in 8 deaths are due to air pollution - and yet human and planetary health are not at the heart of political decision-making. We all have a part to play in shaping future decision-making.

Explain to pupils that as adults they will vote on their elected politicians but they can also do things now to influence the future. Ask: What could we do now? E.g. spread awareness like Greta Thunberg, attend a protest (e.g. the Climate Strikes) or write a letter to your MP or local businesses.

Main activity

1. Prepare a short presentation on air quality and carbon emissions (see the fact sheet at the start of this pack to help you)
2. Present children with some potential policies for the future in the form or Top Trumps (see page 11). Get them to play the cards or come up with their own policies for a clean air future.
3. What would be the trade-offs? Would everyone benefit? What could be some negative consequences? How would we pay for them?
4. As a class choose their favourite policies: Shortlist ten policies and then ask pupils to vote on their preferred choice. Encourage pupils to justify their choices.

Plenary

1. Announce winning policies
2. Discuss whether pupils think these are happening today

Conclude with a discussion on what we can do together to make these policies a reality. You could present some of the other lessons in this pack (e.g. persuasive letter writing, schools competition, pollution masks to raise awareness)

Extension tasks

- Complete some of the other lessons in this pack, e.g. asking pupils to write their own letter
- Form a class action group and work out how their school or their local neighbourhood could do more to address these issues

Resources required

- Top Trump cards
- Factsheet (page 4)
- Flipchart for voting

Lesson plan: Designing impactful air pollution masks

Objective: design a mask that can raise awareness of air pollution health impacts

Duration: 120m

Theme: Transport, environment, society

Subject focus: Art, Textiles

Age: age 14+

Starter

In cities, people walk and cycle past polluting traffic every day. In some cities, to protect against air pollution (and air-borne diseases) citizens are resorting to wearing masks. Masks are even becoming fashionable.

Art can be used as a political statement. That is why we are encouraging you in this activity to design air pollution masks.

After a short discussion on these issues and the pros and cons of using art politically, introduce the main tasks.

Main activity

Lesson 1: Come up with a design

- Research mask design and air pollution art for inspiration
- Use this information to create a quick mood board
- Create a repeat pattern (like the one overleaf), slogan, or similar that can be replicated across your masks, or come up with several pieces of a collection
- Plan out who these masks are for and how they would be used, sold, or marketed

Lesson 2: Create the masks

- Mock-up designs and work out dimensions. Use the template provided for support, or create your own
- Produce one or several masks to show the class

Plenary

Each team presents their mask and explains a) their reasoning for choosing the design and b) how it will be used/sold/marketed (e.g. protest, by the government in a polluted city).

Conclude with a discussion on the limitations of masks to open up wider debate on larger changes required to tackle these issues.

Extension tasks

Get pupils to think about other forms of art they could use. What would have the biggest impact in terms of engagement and positive outcomes for citizens.

Before the class

- If you are shortening the class: prepare paper masks for the pupils. You can find templates online
- Brush up on your air pollution and climate change knowledge

Curriculum links

- **Identify and solve design problems**
- **Develop specifications**
- **Develop and communicate design**

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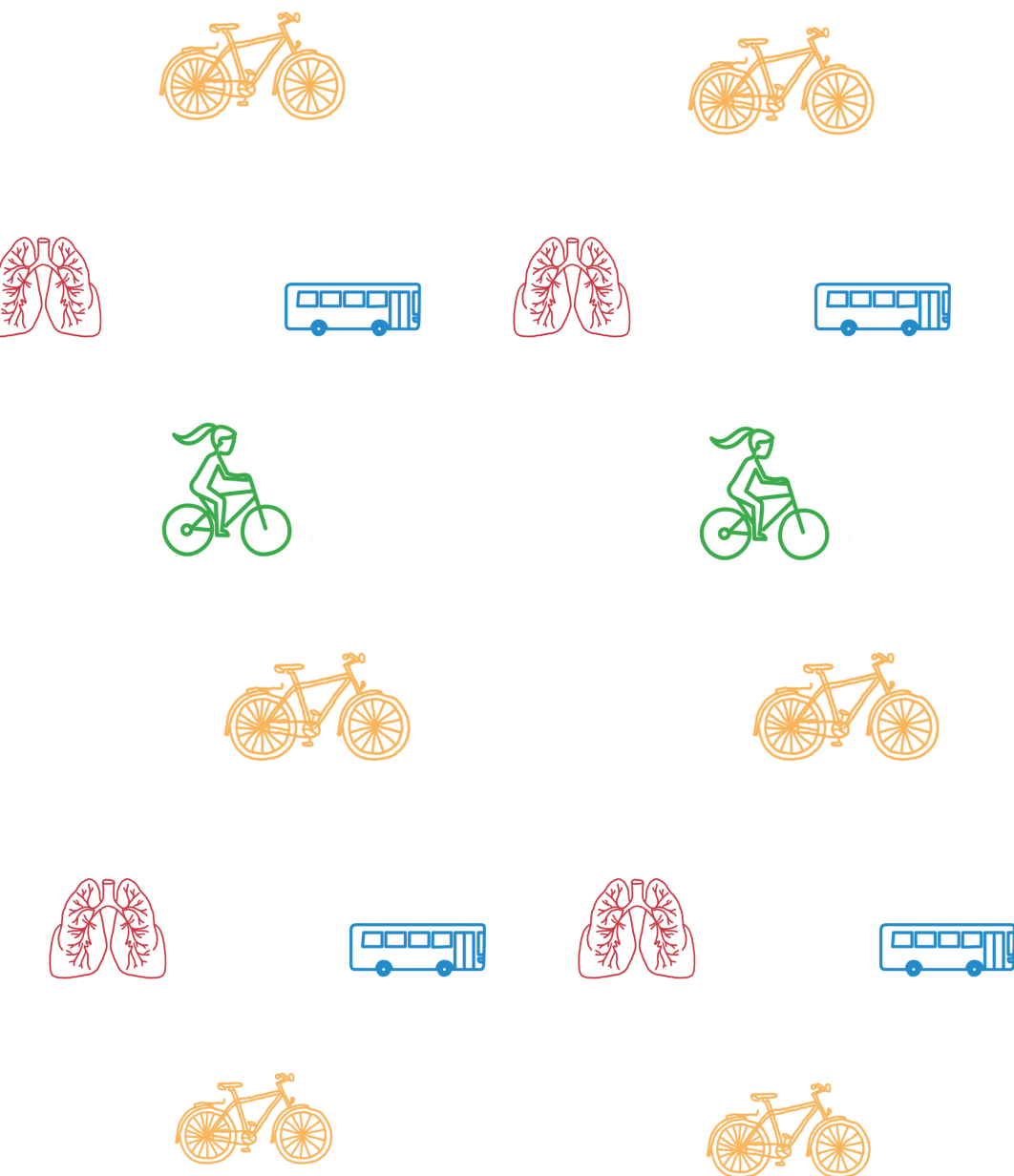# Pollution mask template

(not to scale)

Teenagers and adults

Age 7-12

Small kids (3-6)

ClairCity

Wet Play activities
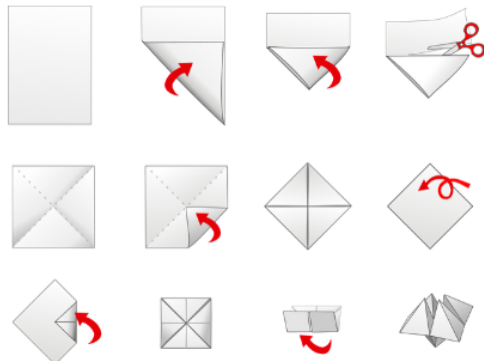
Air pollution chatterbox

A great one for wet play or end of term, this activity makes use of a well-known children's game called chatterbox. Follow the instructions below to create your chatterbox using a sheet of paper and then either use our air pollution suggestions or write your own.

You can print out this page if you would like to use our template.

Resources: plain paper, pens, pencils, scissors

Thanks to our community partners St George Breathing Better for their help in producing these materials!

Folding instructions:

The chatterbox contains the following messages:

- Use a health app to encourage you to walk more! You can often see calories burnt as well!
- Taking public transport reduces air pollution (compared to cars), and you can catch up on your homework or chat to friends on route.
- Cars are the main cause of air pollution in a lot of cities. If you can, walk part of your journey
- Scooting and cycling are excellent travel choices. Avoid pollution by choosing routes away from main roads or quieter routes.
- Walking is the best possible choice for your health. A brisk 10-minute walk has lots of health benefits
- For a child in Bristol, air pollution levels are the same as them smoking 1.5 cigarettes per day.
- Drivers can be exposed to 9-12 times more air pollution than cyclists and walkers.
- Cycling is quick! 2/3 of all journeys in a car are less than 5 miles. That's 20 minutes on your bike.

The Top 5 game

Which of the following risks cause the most premature deaths per year in the EU: obesity, road traffic accidents, smoking, drinking, or air pollution?

Game rules:

Challenge the audience to rank 1-5 (1 being the most): How many deaths are caused in the EU by each risk?

(...Ask the audience to arrange the images in order of most deaths per year)

Turn over your answer set at the end, revealing answers with figures.
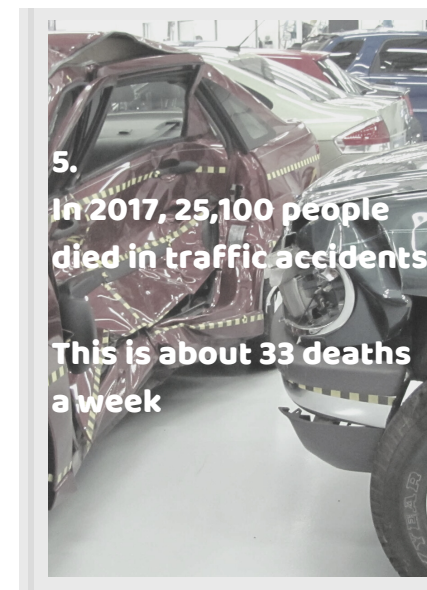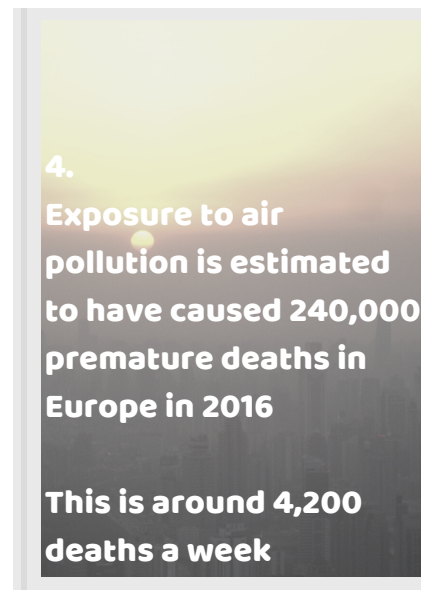
Discuss any surprising findings with the players and end by directing them towards positive things that can be done to tackle the leading cause of death.
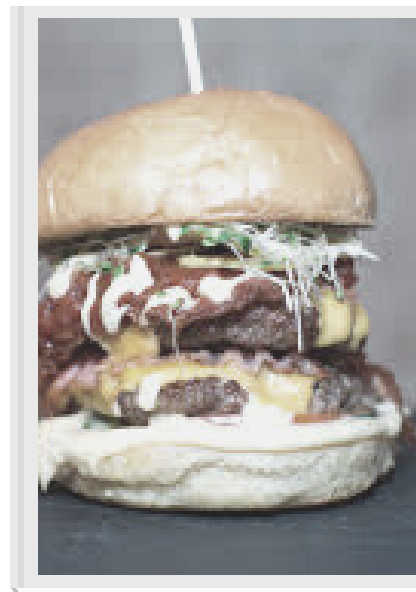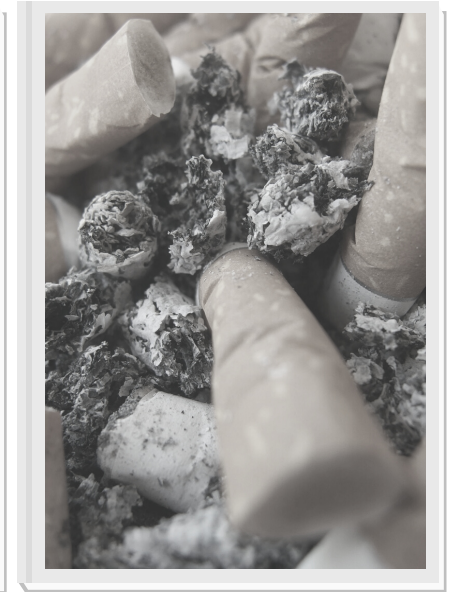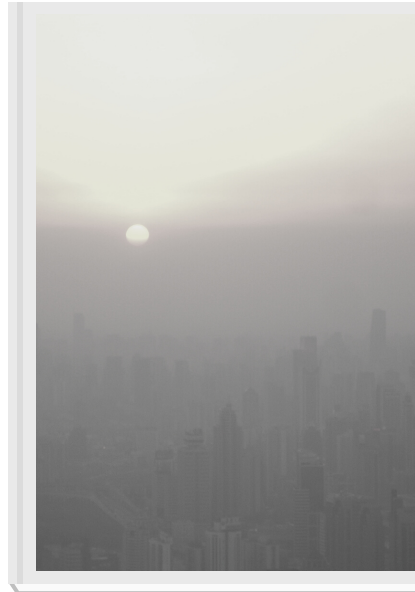
The Top 5 game

Air pollution contributes to: heart attacks, strokes, coronary obstructive pulmonary disease (COPD), lung cancer, heart failure and poor lung and brain development in children.

Each country will have different statistics but across the EU, obesity is the biggest cause of premature death. In the UK, smoking is number one, with obesity, air pollution and drinking ranked second, third and forth, respectively,

1.
Obesity is related to 1 million deaths per year in Europe

This is about 17,500 deaths a week

2.
700,000 people in Europe die from smoking each year

This is about 12,250 deaths a week

3.
Each year there are an estimated 290,000 alcohol-related deaths in Europe

This is about 5,600 deaths a week

4.
Exposure to air pollution is estimated to have caused 240,000 premature deaths in Europe in 2016

This is around 4,200 deaths a week

5.
In 2017, 25,100 people died in traffic accidents

This is about 33 deaths a week

More information:

bit.ly/EUObesity
bit.ly/EUSmoking
bit.ly/EUhealth_pollution
bit.ly/EUAlcohol
bit.ly/EUroadaccidents

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What's the evidence?

There is strong evidence that air pollution impacts our health in multiple ways. Chronic exposure to traffic-related pollutants may even increase the risk of neurological disorders. Both short- and long-term exposures have been associated with reduced human capital, including the academic performance of schoolchildren and the productivity of workers across the adult lifespan. Brain fog may be attributable to air pollution!

In this game ask players place the health impacts in one of the three columns, according to what they think is the correct answer. Once completed, reveal the answers. Best played in teams.

More information:

www.who.int/airpollution/ambient/health-impacts/en/

Development of Type 2 diabetes

Brain fog

Poor lung development in children

Stroke

Lung disease in older adults

Asthma attacks

Heart failure

Lung cancer

Cardiovascular disease

Heart attacks

More premature births

Lower birth rate

Impaired brain development in children

Dementia

Scientific agreement that this is linked to air pollution	Some evidence that this is linked to air pollution, but more research needed	No evidence that this is linked to air pollution

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Scientific agreement that this is linked to air pollution	Some evidence that this is linked to air pollution, but more research needed	No evidence that this is linked to air pollution
Heart failure	Lung disease in older adults	
Cardiovascular disease	Impaired brain development in children	
Lung cancer	Dementia	
More premature births	Poor lung development in children	
Lower birth rate	Brain fog	
Heart attacks		
Asthma attacks		
Stroke		

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Case studies

Youth voice in Aveiro, Portugal

In total, Aveiro engaged over 500 young people during the ClairCity project, from primary through to university age.

Together with the Department of Environment and Planning at the University of Aveiro, the project team worked directly with Gafanha da Nazaré Secondary School, teachers and students in the industrial area of Estarreja Municipality and the Mix&Move initiative of the Municipality of Oliveira do Bairro to reach their audiences.

All the young people were introduced to the project and engaged with quizzes and talks on air quality, behaviour change and practical actions they could take to reduce their impact.

Citizen science was an important part of this process. For example, in Gafanha da Nazaré pupils participated in ClairCity's "My City, My School, My Home" competition that saw them explore health and environmental issues in their area and build a clean air and healthy city model for the future. They also used a Smart School App and tested air quality around their school using low-cost sensors.

For more information
bit.ly/mixandmove
bit.ly/GafanhaSchool

As a result of this engagement, pupils have presented their work at school, encouraging others to act and they have ambitions of sharing their results with the municipality and their parents.

The school itself was already leading the way on sustainable travel, having installed a huge bike park that is unique to the region. Following ClairCity's engagements, more students are cycling to school and some pupils plan to create their own air quality sensors. The project hopes that this school can act as a role model for others wishing to do more for cleaner air.

In Estarreja there is concern over the impact the local chemical industries are having on citizen's health. The industry has a responsibility of care to continually improve its health and environmental performance, so ClairCity worked together with PACOPAR – the community Advisory Panel of Estarreja's Responsible Care® Program – the University, secondary schools and the local Council to create mutually beneficial outcomes. As a result of their engagements, more young people are informed of the issues and equipped to monitor the chemical complexes surrounding air quality. Meanwhile teachers have been trained to educate pupils on air quality and sustainability to raise awareness of these issues.

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Solving Bristol's air pollution problems together

The Bristol team engaged more than 800 children during the course of the ClairCity project, trialling and testing the schools resources in this pack. They further engaged many more families and young people at festivals and during community consultations across the city.

Communications Officer Corra Boushel said: "An exciting part of the activities, alongside getting to do air quality tests, watch for chemical reactions and start planning how to solve air pollution in their neighbourhoods, was a chance for the children to get involved in city democracy. When there was time available, we invited the pupils to write letters to their politicians to explain what they had discovered and share their solutions for Bristol's air pollution".

So far, over 150 letters from young people have been sent to their local councillors, both Mayors and the relevant MPs.

For more information and to read the responses: www.claircity.eu/blog/600-children-solving-bristols-air-pollution-problems

We have been impressed by the dedication and thoughts of the children, and also delighted that many local politicians have found time to respond to the letters directly," added Corra.

All responses were sent on to teachers to make sure that the children know their letters were recieved, read and recognised. As one teacher put it: "From our point of view, writing and sending the Mayor letters made the learning purposeful and very real for the children...Thank you for such a great day!"

Thank you for taking the time to write to me. It's great to hear from young people who are interested in important issues. You came up with some great ideas about how we can change transport to reduce air pollution.... Our [Clean Air] plan is a plan for everyone in the city, and so it is great to see your thoughts on how you think we can reduce air pollution. By working together, we can make Bristol cleaner for everyone.

Marvin Rees, Mayor of Bristol

ClairCity

Actions we can take together

An action plan for implementing change

- Take a walk around your area, perhaps interviewing locals, to identify the biggest air pollution and carbon emission problems. Then act on these issues, building on what is already working.
- Use other resources in this pack, or head to the ClairCity website www.claircity.eu/takeaction
- Get involved in an environmental group in your school or consider setting one up if there aren't any
- Start a campaign at your school to address clean air locally (e.g. campaign for better travel to school or for renewable energy to be used to heat the buildings)
- Make a poster about air pollution and carbon emissions and what we can do to reduce it. Or share ours (on the back page)
- Host an event with invited speakers to inform teachers, parents and pupils of the issues and solutions
- Write a persuasive letter to a polluting business to change their practices
- Take part in a Youth Climate Strike

Clean Air Walking Tips

Use the car less when you can, especially if you drive a diesel

- You are still exposed to air pollution even if you are inside a car, so being in traffic is not safe
- Most traffic pollution in cities come from diesel cars

Increase your distance from traffic wherever possible

- Walk along the section of the pavement furthest from vehicles. Even an increase of 1 metre can help
- Choose side roads rather than the main road when you have the option

Avoid busy roads

- When you have the option, always try to walk upwind of the pollution from vehicles
- If possible avoid busy roads at peak times e.g. during the rush hours when traffic and pollution levels are generally higher

If you are particularly sensitive to pollution (e.g. heart condition, asthma) watch out for news alerts

- For most people, it will still be better to use active travel or get some exercise (e.g. walking or cycling) on higher pollution days
- By not using the car you are reducing the overall amount of pollution, and exercise has many benefits for our physical and mental health

ClairCity

Thanks to our partners!

1. TECHNE Consulting (Italy)
2. Transport & Mobility Leuven (Belgium)
3. University of Aveiro (Portugal)
4. Municipality of Amsterdam (Netherlands)
5. Bristol City Council (UK)
6. Intermunicipal Community of Aveiro Region (Portugal)
7. Liguria Region (Italy)
8. Municipality of Ljubljana (Slovenia)
9. Sosnowiec City Council (Poland)
10. Trinomics B.V. (The Netherlands)
11. University of the West of England, Bristol (UK)
12. PBL Netherlands Environmental Assessment Agency
13. Statistics Netherlands (CBS)
14. Technical University of Denmark (Denmark)
15. Norwegian Institute for Air Research (NILU) (Norway)
16. Regional Environmental Center for Central and
    Eastern Europe (REC) (Hungary)

A special thanks to Point Creative and Line Industries for their
graphical design!