

Educator pack

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



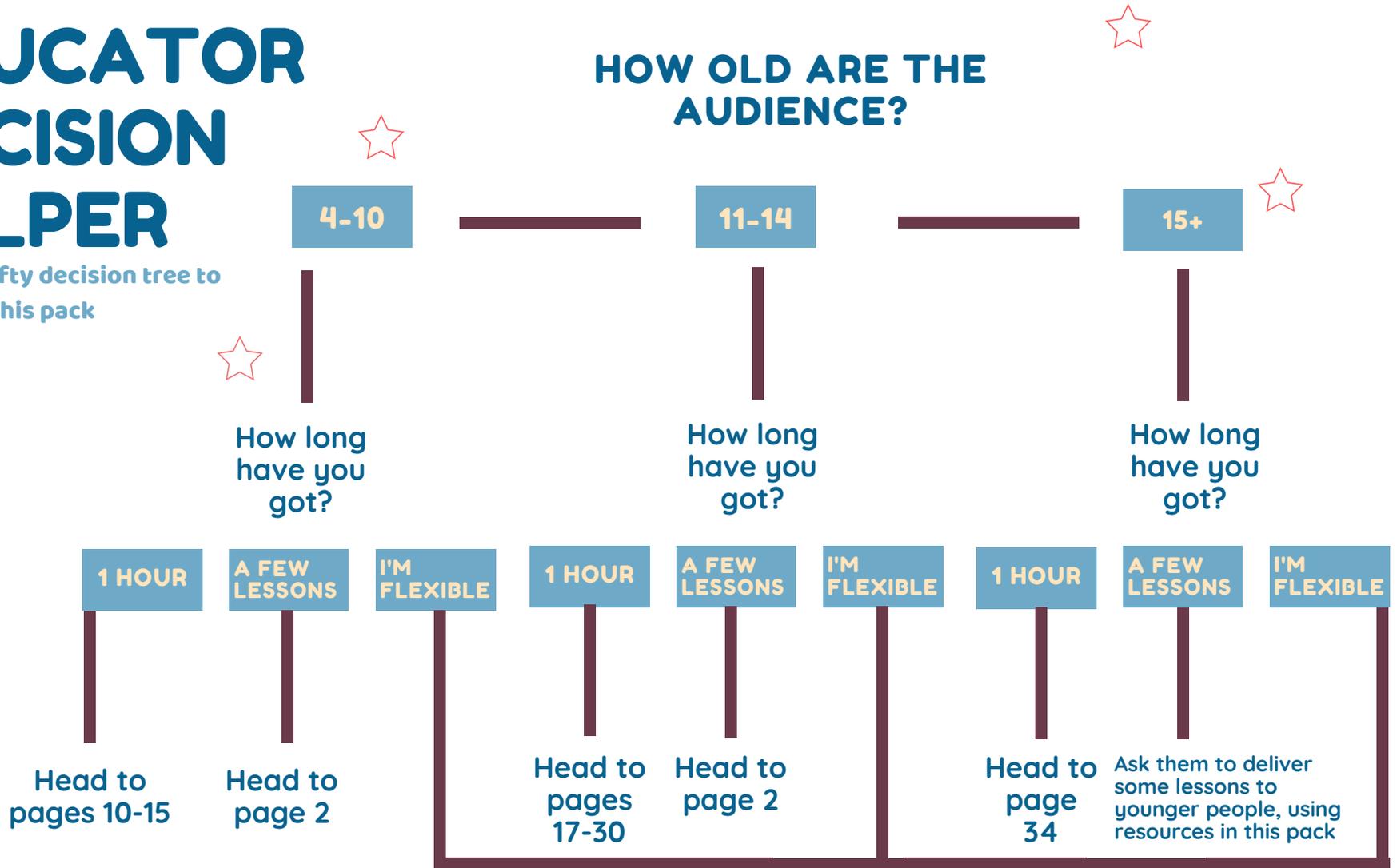
www.claircity.eu



EDUCATOR DECISION HELPER

Use our nifty decision tree to navigate this pack

HOW OLD ARE THE AUDIENCE?



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

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.

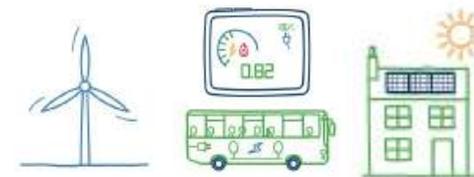
Children are the Future

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

Page 2 Themed curriculum
Page 3 Global shockers
Page 4 The facts on air pollution, carbon emissions and our health
Page 8 LP: Pollution solution
Page 9 LP: Travel Survey
Page 11 LP: Clean Air Top Trumps
Page 13 LP: Persuasive writing
Page 17 LP: Schools competition
Page 22 LP: Citizens Assembly
Page 23 LP: Air pollution masks
Page 26 Air pollution chatterbox
Page 27 The Top 5 game
Page 29 What's the evidence?
Page 32 Youth Voice in Aveiro
Page 33 Solving Bristol's air pollution
Page 33 Actions we can take together
Page 35 Air pollution and climate change infographic

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.

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.



Ages 4-10

Air Pollution Solution science experiment	Page 8
Traffic survey	Page 9
Clean Air Top Trumps decision-making game	Page 11
Persuasive letter writing	Page 13

Ages 11-14

Clean Air Top Trumps decision-making game	Page 11
My City, My School, My Home competition	Page 17
Citizens' Assembly	Page 22
Designing impactful air pollution masks	Page 23

Wet play/extra curricula activities:

Air Pollution chatterbox	Page 26
The Top 5 Game	Page 27
What's the evidence	Page 29

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 (NO_x) and Particulate Matter (called PM_{2.5} 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 NO_x. 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.**

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 (CO₂) 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.

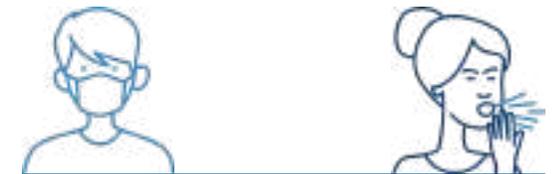
Air pollution differs from greenhouse gas emissions in that it consists of short-term pollutants that persist for just a few weeks. However, its sources are the same. For example, the transport sector is the fastest growing contributor to emissions and accounts for almost ¼ of all CO₂ emissions (a long-lived pollutant). It is also a significant contributor to air

pollution, particularly in cities, through the production of short-lived NO_x and PM₁₀, such as black carbon, or soot.

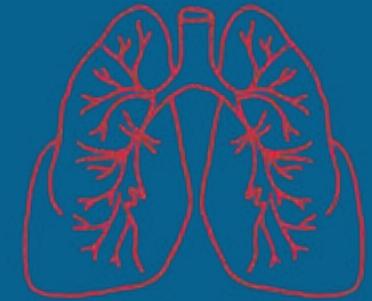
Despite being short-lived, black carbon is the second highest contributor to global heating, after CO₂. Diesel transport (along with household wood burners) is one of the world's major sources of black carbon.

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!



Did you know...

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

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 solutions

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.

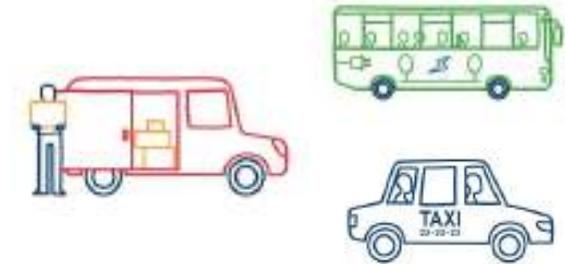
If the children need a reminder about data handling techniques consider using: bbc.co.uk/education/topics/z7rcwmn

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



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/BSASecundary2020>

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?



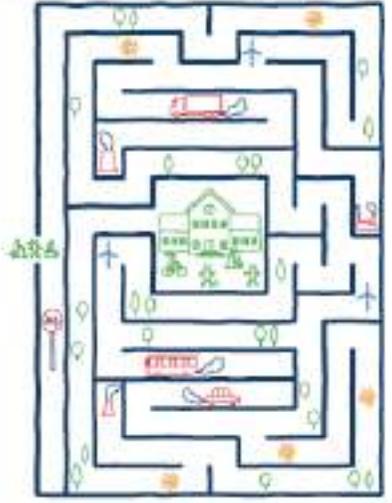
Instructions

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.

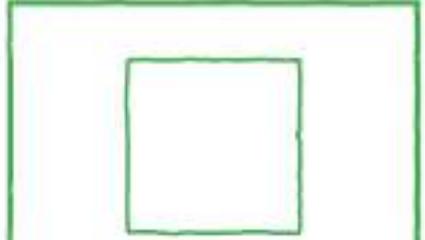
You can create your own cards using the blank cards provided.

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

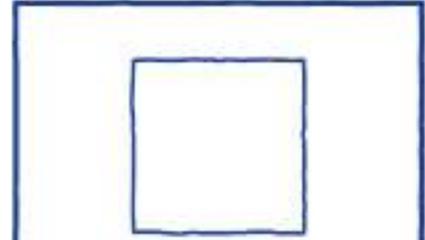


Take the bus to school, for shopping and hobbies

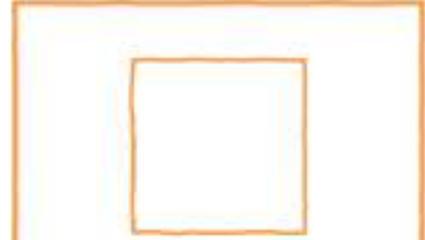
Easy	3
Cheap	5
Fast	5
Environment	7



Easy
Cheap
Fast
Environment



Easy
Cheap
Fast
Environment



Easy
Cheap
Fast
Environment

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

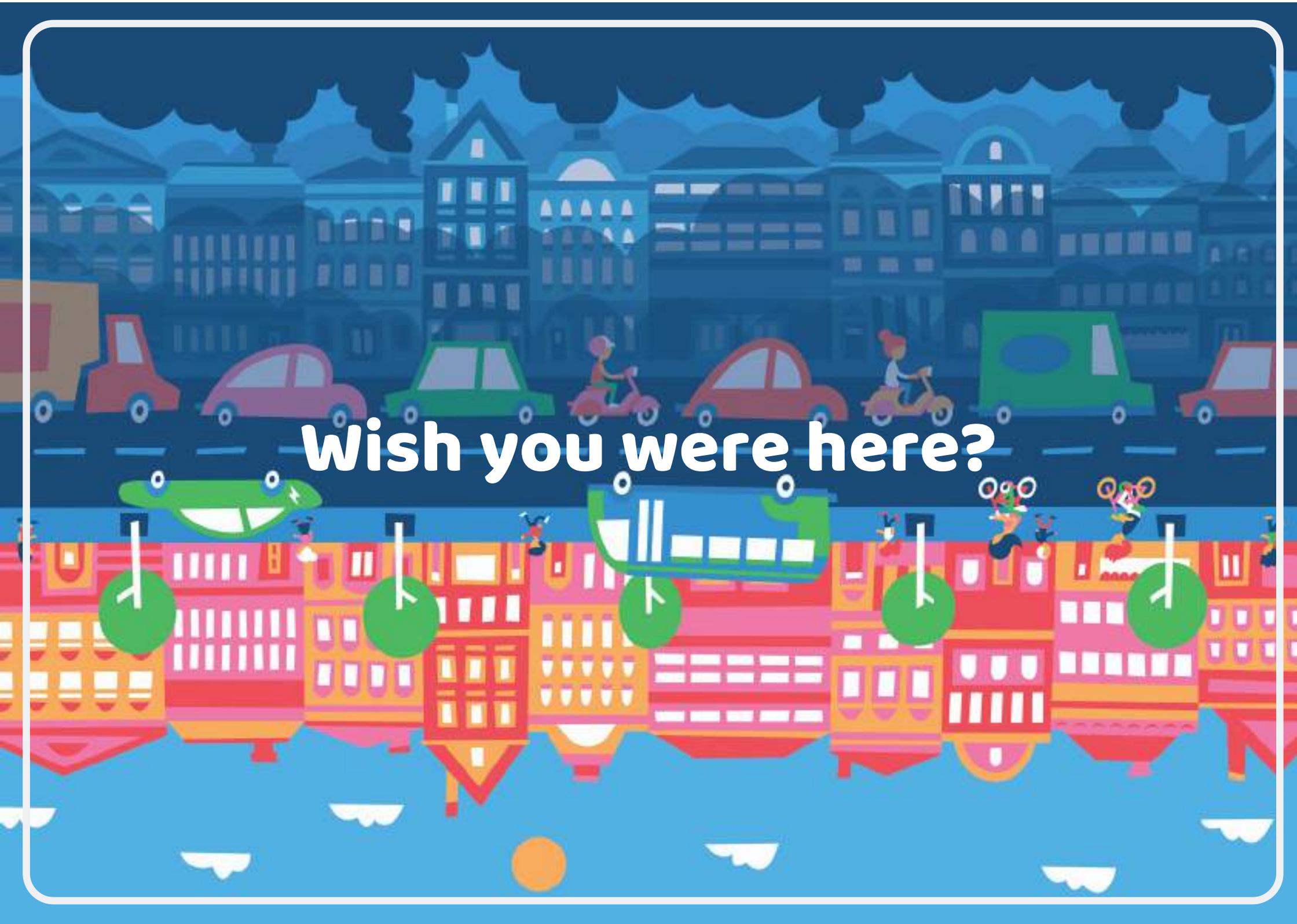
- Design and make persuasive posters to display on community noticeboards, in the school newsletter or lampposts.
- Adapt the letter for different audiences and send multiple copies

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,