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# 6-WEEK STEAM ECO CLUB CHALLENGE

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Our City Our Future: Bristol edition



Created by Sophie Laggan, [Science Communication Unit](#), UWE-Bristol as part of the [ClairCity](#) project.



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# Our City Our Future: six-week STEAM Eco Club Challenge



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## Teacher's guide

[STEM Clubs](#) are out-of-timetable sessions that provide young people with the chance to explore aspects of Science, Technology, Engineering & Mathematics in less formal settings. Eco Clubs work in a similar fashion, encouraging involvement and interest in caring for our planet and acting in its best interest. Forming an Eco Club can lead to [Eco School](#) accreditation. Given the need for everyone to play their part in tackling the climate and ecological emergency, we have combined all these ideas to equip your students in addressing these challenges. NOTE: The arts help us to imagine the future and creatively come up with solutions, so that is why the A has been added to STEM 😊.

This Teacher's Guide will help you to successfully deliver your STEAM (Science, Technology, Engineering, Arts and Maths) Eco Club! It accompanies the STEAM Eco Club PowerPoint slides for hosting the sessions, and a STEAM Eco Club resources pack. All sessions have accompanying resources. See our Challenge planning template at the back of this pack to see which resources accompany which session.

### Setting up a STEAM Eco Club

If you haven't set up a STEAM or Eco Club before, here is all you need to know. If you already have an established club then skip to the next section

#### 1. Get support from colleagues

You will have more fun if you run your STEAM Eco Club Challenge in conjunction with a colleague; it spreads the load and shares the experience. When recruiting support,



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emphasise the fact that they are helping for a limited period of time – this is not an endless commitment they are signing up to! Agree what support they might offer – are they providing a room, materials, expertise? Cast your net wide and make sure to include both teaching and non-teaching staff in your search for support.

## 2. Determine your STEAM Eco Club members

Decide on a cohort you'd like to work with and think about working with a group of no more than about 15 pupils. Be clear about who your club is for: Our City Our Future is designed for primary aged children. Is there additional financial support or personnel available should you choose to work with a specific cohort? If you offer something for those children entitled to pupil premium you could approach your headteacher and request some funding to support the work you plan to do with these pupils.

## 3. Plan the activities for the duration of the Challenge

Use the Challenge planning sheet provided to help plan the activities for the duration of the club. Divide up tasks between yourself and your supporters. There is no need to overcomplicate things; with a challenge there is often a beginning phase, a middle phase and an end phase and planning will help you ensure all of these phases are covered within the 6 weeks. Focus on progression rather than achieving mastery.

## 4. Request STEAM Ambassador input

Consider how some input from a visitor might enhance your STEAM Eco Club experience. [STEM Ambassadors](#) are volunteers who offer to give their time to go into schools to share their knowledge and expertise with teachers and their pupils. Why not see if you can book someone to come to visit your club to help out with one of your activities, provide some feedback on progress of their challenge or to talk to the pupils about their career in STEAM?

## 5. Invite your STEM Eco Club members

Contact the pupils you want to work with, and then get support from home. Send a letter home, inviting the specially selected pupils to the club and explaining to parents what the club is about and the benefits it will offer their child. Make a register of all the pupils who are interested (you may need a main list and a reserve list if you get more than about 15 pupils interested).



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## 6. Launch the club (week 0)

Pick a launch date and hold an event for new members. Introduce the club and give the pupils a taster of what they'll be doing during their time with you. If your club is well-established, you are welcome to skip this step.

## 7. Meet for 6 more weeks

Meet for 6 weeks on the agreed days at the agreed times in the agreed place. Make sure it feels like a club and not just another lesson... juice and snacks always help! Giving your club a name, making badges etc all help to make pupils feel like they belong to something special.

Take a register each week. Stick to your plan as far as possible, but be prepared to be flexible in responding to feedback from your supporters and club members. Only after week one should you invite in new members to replace any that leave and make sure all work is complete by the end of week six, so that you are ready to celebrate!

## 8. Celebrate!

At a separate event during or shortly after week 6 (maybe an assembly?) share the accomplishments of the group with a wider audience and present certificates of participation. Maybe you could invite your visitor back in to make the presentations? You could have a central display board showing photographs of what goes on at the club and encourage club members to contribute to school newsletters or the website.

## 9. Wrap up, evaluate and look forward

Evaluation is crucial – it demonstrates to the team what worked and what could be improved, the learning outcomes of students, and can secure future funding. Use any pictures taken, the answers from quizzes, and children's posters etc. as evidence for your evaluation. Include these in a short report and spend some time reflecting on how you found the process. Ask colleagues, ambassadors and guests to also reflect on the process, which you can also include in the document. Thank everyone for their involvement, wrap up any final admin and after a break, start planning your next 6-week STEAM Eco Club challenge!

## What is Our City Our Future?



# Our City Our Future: six-week STEAM Eco Club Challenge



Our City Our Future emerged from [ClairCity](#), an EU research project that sought to include citizens in decision-making processes around clean air and climate change across Europe. Over 3,500 children and young people were involved during the course of the project from 2016–2020, taking part in various school lessons and activities to learn the problems and collectively come up with solutions.

This STEAM Eco Club Challenge makes use of some of the most popular resources, allowing children to:

- 1) explore the issues
- 2) experiment
- 3) raise awareness
- 4) imagine a better future
- 5) have their say about things that matter to them and feel like they are making a difference

Each child will leave with a greater understanding of the issues, as well as new skills in scientific research, debating and oration, art and creativity, and persuasive writing.

[www.claircity.eu/take-action/educator](http://www.claircity.eu/take-action/educator)



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## Step-by-step instructions

Feel free to adapt this plan and make it your own/to suit the needs of your pupils!

### WEEK 0: LAUNCH EVENT

#### Before the event

1. Edit and print out the title page of the resources PowerPoint to use a poster for your launch event. Include details such as venue and dates, and incentives like juice and biscuits. Share in newsletters and pin to notice boards.
2. Print out the infographics on page two and three of the resources pack, cut out and share with pupils that attend
3. Prepare two bottles of water, one with 3-4 Tablespoons bicarbonate, one plain (if working online, ask children to prepare these bottles beforehand and to find something in the kitchen that they can use as dye, e.g. food colouring, beetroot juice, etc)
4. Gather bunting or similar items to decorate the room
5. Option to advertise at or hold during a school assembly

#### On the evening/during the assembly

1. Ask pupils to add red food dye to both bottles and explain what they see. Explain that the cloudier bottle is what our air is like – polluted, only we can't normally see it.
2. Ask children where they might find clean air, and where they might find polluted air. Challenge them to think about their answers
3. Present page two of the main STEM Eco Club PowerPoint, explaining how the children will learn about both the problems and solutions to air pollution and climate change, and be open to questions

### WEEK 1: WHAT'S THE PROBLEM?

SLIDE 4-33: Introduce the concepts surrounding air pollution and climate change. Pose questions to the children rather than just revealing the answers. E.g. on slide 6 ask 'how might this affect our bodies' before revealing the answers on slide 7. Option to invite



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along a scientist from UWE Bristol's Air Quality Resource Management Unit or another STEM Ambassador to talk about these slides. Contact [Sophie.laggan@uwe.ac.uk](mailto:Sophie.laggan@uwe.ac.uk) for more information.

SLIDE 34-35: quiz children to see how much they've remembered. Answers in 'STEAM Eco club resources' file. Ask them to keep their scores somewhere safe (as you will test them again in week 5).

## WEEK 2: HOW DO THE PROBLEMS AFFECT US?

SLIDE 38-39: Get children to think about how air pollution and climate change might be impacting their city and their school

Use these pointers to help

- name some forms of transport (cars, bicycles, etc)
- name some forms of heating (gas, electric, solar panels)
- name some foods (vegetables, meat, processed food) and where they come from (local farm, from Europe, from Asia, Africa, etc)

SLIDE 40: Children to choose one of the following surveys/assign to groups so together all surveys are covered

SLIDE 41: hand out survey templates (found in resources file). Make sure an adult is accompanying the children at all times if surveying traffic outside

SLIDE 42: children report back on their findings

SLIDE 43: Look at the map of Bristol's Air Quality Management Area. Ask the children to tell you what they think it represents. Explain what the acronyms and words mean (explained in the PPT notes). Head to Bristol's Open Data Air Pollution map, so the children can explore the extent of air pollution across the city. If time, ask children to explore the site and find out what areas of Bristol are the most polluted. Ask: why do you think these are the most polluted areas? When would they be most polluted (e.g. rush hour)? What factors might impact air pollution levels?

Option to direct children to the New York Times article (link in the PowerPoint notes), where they can see what Ugm-3 looks like for their city.



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SLIDE 44-45: discuss which activity may be contributing the most to our trips around the city. Reveal the answers.

## WEEK 3: BECOMING A SUSTAINABILITY SCIENTIST

SLIDE 47-51: follow the instructions for the experiment and refer to the lesson plan (in the resources pack) for more information

SLIDE 51: discuss possible solutions to pollution and climate change – remember, the sources are the same.

SLIDE 66: if time, get the children to design a poster. This task can be given to a child in any lesson, if they have finished their main assignment.

## WEEK 4: CLEAN AIR TOP TRUMPS

SLIDE 70-72: Follow the lesson plan in the resources pack. Create the cards together and in pairs, play the game and vote on favourites (for each category)

SLIDE 73: Discuss if these solutions will be enough to create the future we want. What or who might we be missing?

## WEEK 5: ACTION WEEK

SLIDE 75: Introduce objective of this week – to play our part in creating a better future

SLIDE 76-77: retake quiz and compare with scores on first week. Invite children to reflect on their scores, although this is not compulsory.

SLIDE 78-80: talk through three options and ask children if they have any other ideas. Work in teams to develop their action project. If there is an option particularly relevant to the children's current learning, feel free to choose the most appropriate one before the start of the session and modify the slides accordingly. Lesson plans are available in the resources file for each activity. Reserve a few minutes at the end for children to discuss what they have come up with.





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## WEEK 6: OUR VISION FOR A CLEAN AIR FUTURE

SLIDE 81: invite back the visitors (if used), plus teachers, parents or other adults (e.g. local politician) to share in the children's successes. Allow children some time before the ceremony to develop a short presentation and encourage them to speak. Display the children's artwork, letters, and posters, and discuss what's next. Hand out certificates to all attendees. Option to post the letters then and discuss 'what next' with the children and teachers.

See slide 22 in the resources file for tips on how to run this final assembly, and slide 23 for how to carry out the evaluation so you can improve for next time!



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## Challenge planning template

Session	Date	Activity	Person(s) responsible	Suggested STEM Ambassador topic / role	Equipment/resources needed	Associated slides in resource pack
Launch		<ul style="list-style-type: none"> <li>Bottles – one with clean air, one with polluted air</li> </ul>		Air quality specialist and/or climate change expert	<ul style="list-style-type: none"> <li>Lesson plan</li> <li>Bottles with lids (to shake)</li> <li>Red food colouring or similar</li> <li>Bicarbonate of soda</li> <li>Spoons</li> </ul>	Slide 10
Week 1		<ul style="list-style-type: none"> <li>Introduce the concepts surrounding air pollution and climate change. Pose questions to the children rather than just revealing the answers.</li> <li>Quiz</li> </ul>		Air quality specialist and/or climate change expert	<ul style="list-style-type: none"> <li>Quiz answers</li> </ul>	Slide 5



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<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Week 2</p>		<ul style="list-style-type: none"> <li>• Get children to think about how air pollution and climate change might be impacting Bristol and their school</li> <li>• Surveys</li> </ul>		<p>Data scientist or transport planner</p> <p>– to link up problems with jobs working on solutions</p>	<p>Survey templates and lesson plan</p>	<p>Slides 6–9</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Week 3</p>		<ul style="list-style-type: none"> <li>• Pollution solution (option to skip/be brief, if well covered during launch event)</li> <li>• Design a poster</li> </ul>		<p>Air quality or transport researcher</p>	<ul style="list-style-type: none"> <li>• Lesson plan</li> <li>• Two clear bottles (glass or plastic)</li> <li>• Bicarbonate of soda dissolved in water (“pollution”)</li> <li>• Red grape juice/food colouring/beetroot juice (“reagent”)</li> <li>• Spoons</li> <li>• Sticky labels</li> <li>• Paper</li> <li>• Colouring pens and pencils</li> <li>• Guide on how to design a poster</li> </ul>	<p>Slide 10 and 11</p>



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Week 4		<p>Clean Air Top Trumps</p> <ul style="list-style-type: none"> <li>• Ask students to share the Top Trump(s) from each group</li> <li>• Write down on flipchart</li> <li>• Ask students to vote using sticky dots</li> <li>• If working remotely, this can be done using the <a href="#">voting function on Mural</a></li> </ul>		<p>Member of local government, local MP, etc, to talk about trade-offs, and/or political scientist</p>	<ul style="list-style-type: none"> <li>• Top Trump cards and lesson plan</li> <li>• Pens and pencils</li> <li>• Sticky dots</li> </ul>	Slides 12-16
Week 5		<p>One of the following</p> <ul style="list-style-type: none"> <li>- create a campaign</li> <li>- design a mask</li> <li>- write a persuasive letter</li> </ul>		<p>Artist, campaigner, writer (depending on option selected)</p>	<ul style="list-style-type: none"> <li>• Lesson plan</li> <li>• Campaign plan of action template</li> <li>• Mask template</li> <li>• Postcard templates</li> </ul>	Slides 16-20
Week 6		<p>Presentations - ask students to write down</p>		<p>Invite back all ambassadors, + teachers,</p>	<ul style="list-style-type: none"> <li>• Display materials developed over the six-weeks</li> <li>• Pen and paper</li> </ul>	Slides 21-23



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		and prepare a short speech Award ceremony Evaluation		parents, a local MP, etc	<ul style="list-style-type: none"> <li>• Award certificates for each child and guide on how to run the final assembly</li> <li>• Evaluation board with sticky dots, post-its and smiley faces</li> </ul>	
<p><b>Notes</b></p> <ul style="list-style-type: none"> <li>• You may need to schedule the celebration event for a time when one or more visitors are available to provide feedback.</li> <li>• Week 5 could be extended by a week, depending on progress (and availability).</li> <li>• STEM Ambassador interactions will depend on whether or not you can recruit a volunteer for that week, and what sort of interaction they might be able to suggest. Flexibility is required, the activity will need to go ahead regardless of Ambassador presence.</li> </ul>						

