

Sustainability Solutions Summit

Teacher Guide with Lesson Plans



How might we reach Net Zero?

This guide will help you to plan a discussion summit for your students, to learn more about climate action and sustainability solutions. The lesson plans provide ideas for how to run a Sustainability Solutions Summit in your school, along with the resources you might use to inspire your students.

We are asking your students to think like engineers during the summit – it's all about finding solutions to the problems our society faces. We want them to be curious, work collaboratively, and be resourceful and resilient.

Who can get involved?

Students from a variety of subjects can contribute to solutions for sustainability. Students studying Geography, Biology, Chemistry, Physics, Maths, Psychology, Sociology, Politics, Computer Science, Economics, and Engineering particularly have an important part to play.

The summit will address the social, environmental, and economic pillars of the [Sustainable Development Goals](#). You can refresh your memory, or your students', using this guide from the BBC:



<https://www.bbc.co.uk/bitesize/topics/z3b86sg/articles/z7rkcmn>

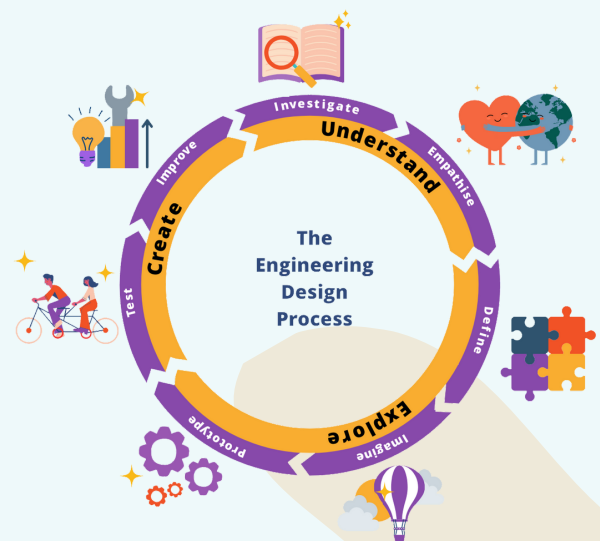
You can also get inspired with more amazing engineering ideas for sustainability with the 1000 Solutions website: <https://solarimpulse.com/>

Facilitating discussions

During the summit your students will explore the variety of ways that engineering can help tackle the Climate Emergency and discuss the interconnected solutions needed for future sustainability. Encourage your students to share their ideas, and learn from their peers as well as the engineering experts featured in the videos.

Lesson Plans

You can operate the summit in a variety of ways; as a daily whole year group summit, a 1-2 hour lesson plan, or a 1 hour self-guided homework. We have provided lesson plans to help you decide how you might run the summit in your school (plans on pages 5-7).



Climate Action Plans Q&A

The Climate and Ecological Emergency will shape our future, and that's why it's important that young people have their say.

In the run up to COP26 in 2021, we invited our leading West of England politicians to take part in live online discussions with local students, presenting their 2030 Climate Action Plans.

You can view these discussions on the DETI Inspire YouTube channel:

- [Discussion with Bristol Mayor Marvin Rees](#)
- [Discussion with South Gloucestershire Councillor Toby Savage](#)
- [Discussion with Bath & North East Somerset Councillor Sarah Warren](#)
- [Discussion with WECA Mayor Dan Norris](#)

To find out more about why 2030 is the goal in our regional timeline, you could read the reports, or news summaries, from the Inter-governmental Panel on Climate Change:

Code Red:
<https://www.bbc.co.uk/news/science-environment-58130705>

2030 and 1.5C maximum heating policy report:
https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf

2030 news summary:

<https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>

If you or your students want to gem up on what our politicians have promised to do, you can find their Climate Action plans here:

Bristol City Council
<https://www.bristol.gov.uk/documents/20182/33379/Mayor%27s+Climate+Emergency+Action+Plan+2019+FINAL>

South Gloucestershire Council
<https://beta.southglos.gov.uk/climate-emergency-in-south-gloucestershire/>

Bath and North East Somerset Council
<https://beta.bathnes.gov.uk/responding-climate-emergency>

West of England Combined Authority
<https://www.westofengland-ca.gov.uk/helping-to-tackle-the-climate-emergency/>



What is COP26?

COP26 was a global United Nations summit about climate change and how countries are planning to tackle it, hosted in Glasgow in November 2021.

You can read more about COP26 here:
<https://ukcop26.org/>

The UK Government School Resource site for COP26 is here: <https://together-for-our-planet.ukcop26.org/schools-pack-resources/>

To get ready for your summit, you might like to watch the 1 hour Climate Inset video from the UK Schools Sustainability Network. This provides an introduction to climate change, and how schools can take action.
<https://www.youtube.com/watch?v=pbbyzLhmKkk>

Thinking like an engineer

Thinking like an engineer involves developing a solutions-finding mindset, or engineering habits of mind.

The graphic below from the Royal Academy of Engineering neatly sums up the learning habits which you can encourage in your students.

If you want to know more about where these ideas came from, you can find out more in this report:
<https://www.raeng.org.uk/publications/reports/thinking-like-an-engineer-implications-full-report>



Engineering Design Process

The lesson plan follows the Engineering Design Process to guide your students through the summit, tackling problems which need to be solved to reach Net Zero in the West of England. There is a separate [self-guided worksheet](#) that your students can use.



Investigate

First ask the students to **investigate** the problem, by watching a summary from an expert on the topic. Over the course of the summit you will explore problems with Transport, Energy, and Waste.



Empathise

Next, prompt the students to think through why we have this problem. Ask them to **empathise** with citizens to discuss why people haven't already adopted environmentally friendly behaviours.



Define

Engineers would have to **define** the exact problem they need to work on. Our regional leaders have already done this in their climate action plans, with defined targets for how much our emissions need to reduce by 2030.



Imagine

The students' next challenge is to **imagine** the solutions. We have started them off with three 'postcards from the future' – each video offering a different solution to the same problem. We've framed the question as 'how might we reach net zero by 2030?'

"How might we" is a powerful design thinking tool, where students are encouraged to be creative to come up with new ideas. The summit lesson plans are framed around the Bristol Climate Action Plan targets for Transport, Energy and Waste.



Prototype



Test



Improve

Engineers would then make a **prototype** of their idea, **test** it in the real world (or digitally) and then **improve** it if needed.

Through group discussion your students will refine their ideas, and could even think of ways to improve the West's Climate Action Plan.

Transport

Lesson plan

Objectives

This lesson plan indicates how to run the summit in your school. There is also an accompanying [self-guided document](#) you can send directly to students for home learning or homework.

Question

How might we take 40% of traffic off our roads by 2030?



Stage



Timings



Task

Pre-summit	Before session	Work out your students' current knowledge about climate change, net zero, and COP26. Send them the resources required which are listed earlier in this document (pages 1-3).
Investigate	15 mins 15 of 120	- Watch the Introduction video about the facts of carbon emissions from road transport. - What else do your students want to know? Ask them to do more research if needed.
Empathise	15 mins 30 of 120	- Use the student guide to prompt the students through the questions. The aim is for the students to understand the problems different citizens might have in reducing road miles. - This results in our Defined problem statement – how might we take 40% of traffic off our roads by 2030?
Imagine	15 mins 45 of 120	Watch the three videos highlighting ideas for 'how might we take 40% of traffic off our roads by 2030?'. Each video presents a different solution to the problem.
Prototype, Test	60 mins 105 of 120	- Use the student guide to prompt the students through the questions. Give the students time to discuss their views with each other. Which solution do they think should be prioritised? Do they have any better solutions? - If you are able to find support from a STEM Ambassador or local engineer, ask them to participate in this part of the discussion. The students can present their ideas and ask for feedback from a real-life engineer.
Improve	15 mins 120 of 120	- Ask the students to think of questions they would like to ask their local politicians. - You can hear what Mayor Marvin Rees has to say about the Bristol Climate Action Plan and the theme of transport by viewing his discussion video.

Energy

Lesson plan

Objectives

This lesson plan indicates how to run the summit in your school. There is also an accompanying [self-guided document](#) you can send directly to students for home learning or homework.

Question

How might we heat our homes without fossil fuels by 2030?



Stage

Timings

Task

Pre-summit	Before session	Work out your students' current knowledge about climate change, net zero, and COP26. Send them the resources required which are listed earlier in this document (pages 1-3).
Investigate	15 mins 15 of 120	- Watch the Introduction video about the facts of carbon emissions from energy. - What else do your students want to know? Ask them to do more research if needed.
Empathise	15 mins 30 of 120	- Use the student guide to prompt the students through the questions. The aim is for the students to understand the problems different citizens might have in getting rid of gas boilers, affording energy, and heating their homes. - This results in our Defined problem statement – how might we heat our homes without fossil fuels by 2030?
Imagine	15 mins 45 of 120	Watch the three videos highlighting ideas for 'How might we heat our homes without fossil fuels by 2030?'. Each video presents a different solution to the problem.
Prototype, Test	60 mins 105 of 120	- Use the student guide to prompt the students through the questions. Give the students time to discuss their views with each other. Which solution do they think should be prioritised? Do they have any better solutions? - If you are able to find support from a STEM Ambassador or local engineer, ask them to participate in this part of the discussion. The students can present their ideas and ask for feedback from a real-life engineer.
Improve	15 mins 120 of 120	- Ask the students to think of questions they would like to ask their local politicians. - You can hear what Councillor Toby Savage from South Gloucestershire Council and Councillor Sarah Warren from Bath & North East Somerset Council have to say about their Climate Action Plans and the theme of energy by viewing their discussion video.

Waste

Lesson plan

Objectives

This lesson plan indicates how to run the summit in your school. There is also an accompanying [self-guided document](#) you can send directly to students for home learning or homework.

Question

How might we reduce our waste by 65% by 2030?



Stage

Timings

Task

Pre-summit	Before session	Work out your students' current knowledge about climate change, net zero, and COP26. Send them the resources required which are listed earlier in this document (pages 1-3).
Investigate	15 mins 15 of 120	- Watch the Introduction video about the facts of carbon emissions from waste. - What else do your students want to know? Ask them to do more research if needed.
Empathise	15 mins 30 of 120	- Use the student guide to prompt the students through the questions. The aim is for the students to understand why we throw so much waste away, and why different citizens are not already reducing, repairing or recycling their waste. - This results in our Defined problem statement – how might we reduce our waste by 65% by 2030?
Imagine	15 mins 45 of 120	Watch the three videos highlighting ideas for 'How might we reduce our waste by 65% by 2030?'. Each video presents a different solution to the problem.
Prototype, Test	60 mins 105 of 120	- Use the student guide to prompt the students through the questions. Give the students time to discuss their views with each other. Which solution do they think should be prioritised? Do they have any better solutions? - If you are able to find support from a STEM Ambassador or local engineer, ask them to participate in this part of the discussion. The students can present their ideas and ask for feedback from a real-life engineer.
Improve	15 mins 120 of 120	- Ask the students to think of questions they would like to ask their local politicians. - You can hear what Mayor Dan Norris has to say about the West of England Climate Action Plan and the theme of waste by viewing his discussion video.

Further Resources for Teachers

School-wide climate action

Climate change is a complicated issue, but your summit showed that we have the solutions, so we just need to get going!

This pack of resources aims to help teachers feel more confident teaching about climate change and sustainability solutions, so you can empower yourself and your students to take action.

If you're inspired by the Sustainability Solutions Summit, you may like to encourage others in your school to watch the 1 hour Climate Inset video from the UK Schools Sustainability Network. This provides an introduction to climate change, and how schools can take action:

<https://www.youtube.com/watch?v=pbbyzLhmKkk>

You can also make your whole school climate ready, by joining networks designed to support climate action. Find out more about how to become an [Eco-School](#) or [Climate-Ready](#) and join a network of schools by signing up to [Let's Go Zero](#).

You can also learn more about how your school can generate its own energy with the [Schools Energy Co-operative](#) or [Solar For Schools](#).

If your students would like to act on their ideas and the solutions discussed, you can prompt them to make a difference in their community using this Community Action pack from ClairCity:

<http://www.claircity.eu/category/action-kits/community-activator/>

Information for Adults about Climate Solutions

If you would like to take more climate action in your personal life, you may be interested in taking a course to learn more.

Project Drawdown has produced an excellent series of free materials and resources highlighting Climate Solutions: <https://t.co/luRO1KFsit>

You can also get inspired with more amazing engineering ideas for sustainability with the 1000 Solutions website: <https://solarimpulse.com/>

If radio is your thing, then Radio 4 has produced a whole show devoted to '39 Ways to Save the Planet': <https://www.bbc.co.uk/programmes/m000qwt3>



Taking Climate Action as a School

If your students are now inspired, here is a [list of eco projects from COP26](#) you can run with your school.

Met Office for Schools

Weather and climate affect everything, from the way we live, to what we eat, to our personal safety. [Met Office for Schools](#) will help young people understand the wide-reaching impacts of weather and climate change locally and globally, for people, places and businesses.

Talking to young people about the climate

Find thoughtful guidance on how to talk to young people about climate change on [National Geographic](#) or [Thought Box](#).

Environment and nature programmes for students and educators

Many people connect to climate change through appreciating nature and the outdoors, so it's a great way to take your learning outdoors.

Become a beekeeping school with [The British Beekeepers Association](#).

Encourage children to be close to nature with [Nature Friendly Schools](#).

Get in touch with the [Green Schools Project](#) to engage young people in environmental projects.



Resources and short projects for Upper Primary and Secondary Schools

Use [World's Largest Lesson](#) resources to introduce climate change to students.

Bring environmental action into the classroom with [Transform our World](#).

Access climate guides and classroom resources on [Our Planet](#).

Provide inspiring activities for your classroom with the [Do your bit](#) digital challenge.

Looking for outdoor lesson ideas? Check out [Outdoor Classroom Day](#) resources.

Use [WWF UK free curriculum-linked resources](#) designed to help pupils explore environmental issues in an engaging and motivating way.

Check out the [Earth School](#) 30 online 'quests' for students around the world to celebrate, explore and connect with nature.

Taking Climate Action in the Community

There are many Climate Action Groups who are making a difference in communities across the UK. You could join a local group to enact sustainability solutions locally, and to campaign for more action. Friends of the Earth can help you find a group near you:

<https://friendsoftheearth.uk/about/climate-action-groups>



Digital Engineering

This summit was first developed as the Youth Engagement with Engineering for Sustainability Summit (YEES). The materials were produced by UWE Bristol's Science Communication Unit in partnership with I'm an Engineer Get Me Out of Here.

The Summit was funded by the Digital Engineering Technology and Innovation (DETI) Inspire initiative in the West of England, you can find all the resources on our website:

<https://www.digitaltrailblazers.net/resources>

About DETI Inspire

DETI Inspire champions science for children in the West of England with a particular focus on breaking stereotypes and challenging perceptions about STEM careers in order to appeal to under-represented groups in engineering.

Our vision is for every young person in the West of England to have access to inclusive, engaging and inspiring engineering experiences with real-life relatable role models.

We make it our mission to support and inspire the next generation of digital engineers.

I'm an Engineer

I'm an Engineer is a student-led, online STEM engagement and enrichment project. Since 2012 it has connected 25,000 students with 370 engineers.

Evaluation shows the online format is highly effective at reaching and engaging young people, especially those under-served by other STEM interventions.

For more information and resources visit <https://yeess.imanengineer.org.uk/>

