

Youth Engineering for Environmental Sustainability Summit

11-13 October 2021

Guide for Teachers with Lesson
Plans

Full programme of events can be found at
<https://yeess.imanengineer.org.uk/>



Say YEESS to Climate Action!

We are asking your students to think like engineers during this 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. This lesson plan and guide outlines how the summit will run, and how you can help your students say YEESS to climate action!

Who can get involved?

Students from a variety of subjects can contribute to solutions for sustainability. KS5 Students studying Geography, Biology, Chemistry, Physics, Maths, Psychology, Sociology, Politics, Computer Science, Economics, and Engineering particularly have an important part to play.

The YEESS 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>

SUSTAINABLE DEVELOPMENT GOALS

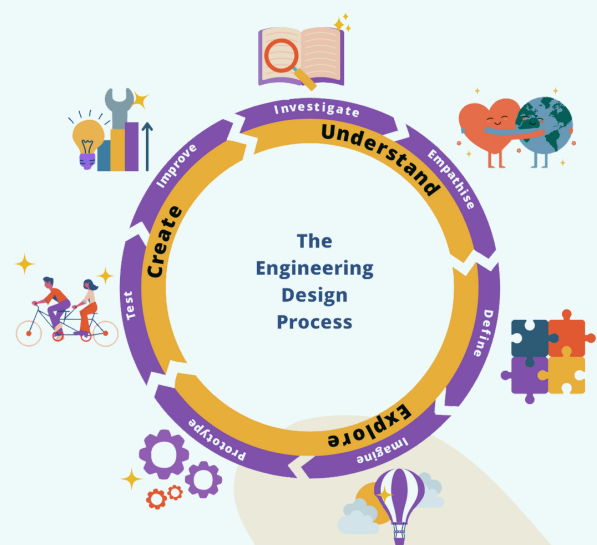


I'm an Engineer platform

All our discussions are carried out online using the I'm an Engineer platform, so you can contribute from anywhere in the UK. We will explore the variety of ways that engineering can help tackle the Climate Emergency and discuss the interconnected solutions needed for future sustainability. Young people can directly chat to each other in a safe environment, and learn from their peers as well as the engineering experts.

Lesson Plans

You can operate the summit in a variety of ways; as a daily whole Sixth Form 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 YEESS materials 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 we want young people to have their say.

We have invited our leading West of England politicians to take part in live online discussions, where every day from 11-13 October 2021, they will present their 2030 Climate Action Plans.

Young people can directly ask the politicians questions, and the resulting discussions will be communicated to policymakers in the West of England, and showcased to international audiences at COP26.

Tune in live at 2:30pm each day, and make sure you ask your questions on the I'm an Engineer chat:

<https://yeess.imanengineer.org.uk/>

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?

The COP26 event is a global United Nations summit about climate change and how countries are planning to tackle it.

COP stands for Conference of the Parties, and will be attended by countries that signed the United Nations Framework Convention on Climate Change (UNFCCC) - a treaty agreed in 1994.

The meeting taking place in Glasgow in November 2021 will be the 26th meeting, which is why it's called COP26.

You can read more about the aims of COP26 here:

<https://eciu.net/analysis/briefings/international-perspectives/what-is-cop26-who-will-attend-it-and-why-does-it-matter?s=08>

The UK Government School Resource site for COP26 is here:

<https://together-for-our-planet.ukcop26.org/schools-pack-resources/>

To get ready for the YEES 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 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

We will be following the Engineering Design Process to guide your students through the summit. Each day we tackle a different problem which needs 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 we ask the students to investigate the problem, by watching a summary from an expert on the topic. Over the course of the summit we will explore the problems with Transport, Energy, and Waste.



Empathise

Next we ask that you prompt the students to think through why we have this problem. We will 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

So the students' next challenge is to imagine the solutions. We have started them off with three 'postcards from the future' – each 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. We have framed each day 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 the online discussions your students will refine their ideas, and ultimately could improve the West's Climate Action Plan.

Students can then test their ideas out on our regional politicians – don't forget to lodge your questions for the live Q&A each day!

Monday 11th October - Transport

YEES in-school lesson plan

Objectives

This lesson plan indicates how to run the summit in 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	<ul style="list-style-type: none"> 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.
Investigate	9am	<ul style="list-style-type: none"> 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	9:15am	<ul style="list-style-type: none"> 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	9.30am	<ul style="list-style-type: none"> 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	9.45am - 12pm	<ul style="list-style-type: none"> 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? Ask the students to write their views into the I'm an Engineer chat. What do other students think? How do the real-life engineers respond?
Improve	2.30pm	<ul style="list-style-type: none"> Ask the students to write their questions to the politicians in the live I'm an Engineer chat. Today you can chat to Mayor Marvin Rees and hear about the Bristol Climate Action Plan. The politicians will hear and respond to the views of young people which will influence future versions of the climate action plans!

Tuesday 12th October - Energy

YEES in-school lesson plan

Objectives

This lesson plan indicates how to run the summit in 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	<ul style="list-style-type: none"> 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.
Investigate	9am	<ul style="list-style-type: none"> 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	9:15am	<ul style="list-style-type: none"> 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	9.30am	<ul style="list-style-type: none"> 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	9.45am - 12pm	<ul style="list-style-type: none"> 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? Ask the students to write their views into the I'm an Engineer chat. What do other students think? How do the real-life engineers respond?
Improve	2.30pm	<ul style="list-style-type: none"> Ask the students to write their questions to the politicians in the live I'm an Engineer chat. Today you can chat to Councillor Toby Savage from South Gloucestershire Council and Councillor Sarah Warren from Bath & North East Somerset Council. The politicians will hear and respond to the views of young people which will influence future versions of the climate action plans!

Wednesday 13th October - Waste

YEES in-school lesson plan

Objectives

This lesson plan indicates how to run the summit in 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	<ul style="list-style-type: none"> 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.
Investigate	9am	<ul style="list-style-type: none"> 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	9:15am	<ul style="list-style-type: none"> 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	9.30am	<ul style="list-style-type: none"> 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	9.45am - 12pm	<ul style="list-style-type: none"> 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? Ask the students to write their views into the I'm an Engineer chat. What do other students think? How do the real-life engineers respond?
Improve	2.30pm	<ul style="list-style-type: none"> Ask the students to write their questions to the politicians in the live I'm an Engineer chat. Today you will also hear how the engineers got into their careers. The students can chat to Mayor Dan Norris about the West of England Climate Action Plan. The politicians will hear and respond to the views of young people which will influence future versions of the climate action plans!

Digital Engineering

All the materials from the YEES Summit were produced by the initiative for Digital Engineering Technology and Innovation (DETI) in the West of England, in partnership with I'm an Engineer Get Me Out of Here.

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.

