UN Sustainable Development Goals Posters 14 to 18 years Teacher Notes

The Institution of Chemical Engineers wants to provide teachers with access to educational and careers resources to showcase the range of career options in chemical engineering through DiscoverChemEng. Chemical engineers play a pivotal role in how we live, working across every industry, across the globe, linking sectors together to help address the United Nation's Sustainable Development Goals (UN SDGs).

Chemical engineers are committed to finding a more sustainable way of manufacturing the products and services we need to lead healthy, fulfilling and meaningful lives. To meet these goals, we need to encourage more young people to consider a career in chemical engineering.

The presentation is aimed at pupils aged 14-18 years. There are also versions for younger students, which may be helpful if a more accessible version is required.

Learning objectives

Pupils have the opportunity to:

- ✓ learn about some of the UN SDGs
- ✓ generate and share ideas about global challenges
- ✓ think about what the UN SDGs might mean for young people around the world

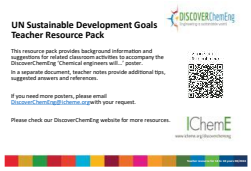
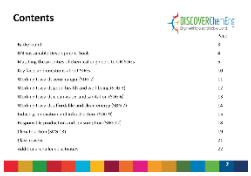
Curriculum links

Science
Maths
Personal, social, health and economic (PSHE)
Citizenship and decision-making

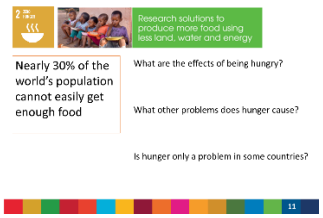
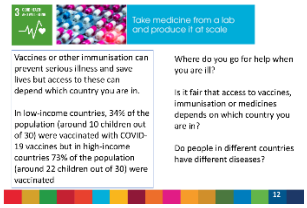
You may be aware of students in your class affected by some of the challenges highlighted in this resource, so you can tailor discussions as needed.
All references accessed July 2024, and links are provided at the end.

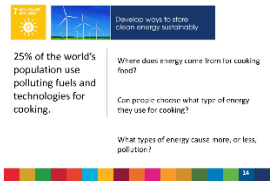
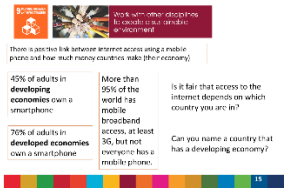
Timing

This can be run in one session taking around 60 to 90 minutes depending on your class, how many ideas and questions the students generate and if the additional challenges are used. It can also be run as an introduction followed by bite-sized sessions taking each SDG in turn, or setting the challenges for independent research.

Slide number		Presentation Notes
1		Introduction for teacher to explain how the presentation supports the DiscoverChemEng poster 'Chemical engineers will…' about the United Nations Sustainable Development Goals (UN SDGs).
2		Contents If you want to explore resources for the UN SDGs, go to https://www.un.org/sustainabledevelopment/student-resources/ For the 2023 report, go to https://sdgs.un.org/sites/default/files/2023-07/The-Sustainable-Development-Goals-Report-2023_0.pdf

Slide number		Presentation Notes
3		Background to chemical engineering and the UN SDGs. Video link to set the scene about chemical engineering. For more about becoming a chemical engineer, go to https://www.icheme.org/education-career/discoverchemeng/school-students/
4		There are 17 goals, and some of them link well to what chemical engineers are working towards. For the 2023 report, go to https://sdgs.un.org/sites/default/files/2023-07/The-Sustainable-Development-Goals-Report-2023_0.pdf
5		If you would like additional posters, go to If you need additional posters, please email DiscoverChemEng@icheme.org and ask for the 'I want to…' poster.
6		Additional copies of these two posters are included if you want to print and share paper copies in the class, however the activity can be completed by making notes on mini-whiteboards, or using pcs/tablets to view the posters. Students may make more connections than the suggested answers.
7		Copy of UN SDGs
8		Copy of chemical engineer priorities
9		Additional copies of these two posters are included if you want to print and share paper copies in the class, but this activity can be completed by making notes on mini-whiteboards, or using pcs/tablets to view the posters. Suggested answers shown. Students may make more connections than the suggested answers. Shows how chemical engineering roles work towards engineering a sustainable world.

Slide number		Presentation Notes
10		How to use the next slides with prompt questions
11		<u>Ideas for answers to questions.</u> <u>What are the effects of being hungry?</u> Rumbling tummy Grumpy/'hangry' Difficult to learn Lack of concentration Tired Encourage students to share their thoughts This may be a sensitive topic for some families. <u>What other problems does hunger cause?</u> Difficult to enjoy school, sport Wider problems in a community <u>Is hunger only a problem in some countries?</u> There may be awareness of food banks or charity work locally or problems with food supplies elsewhere in the world
12		There are many indicators that link to this SDG and some are more challenging depending where you live in the world: reduce and prevent maternal and neonatal deaths; end epidemics and diseases (including malaria); educate people about mental health, sex education; reduce accidents; ensure access to vaccines and medicines. For this SDG, the focus is about everyone enjoying a right to health and being able to get health care, vaccines and medicines when they need them. More equal health care should reduce the difference in life expectancy between countries. <u>Ideas for answers to questions.</u> <u>Where do you go for help when you are ill?</u> Doctor / Nurse / Pharmacist Hospital Dentist Optician Anyone else…? <u>Is it fair that access to vaccines/immunisation or medicines depends on which country you are in?</u> This is about availability of vaccines/immunisation rather than whether people want or don't want immunisation <u>Do people in different countries have different diseases?</u> Malaria – only in some countries Tuberculosis, Polio and other childhood diseases are more common in countries where fewer children are vaccinated.

Slide number		Presentation Notes
13		Safe sanitation is a broad description including waste water facilities, it may be helpful to focus on one aspect; water for washing. If pupils have been on a camping holiday, residential trip or a camp with Scouts, Guides or another youth group, they may have an awareness of the need to fetch and carry water. Ideas for answers to questions. What happens to waste water, from toilets and showers and the kitchen sink? Goes down the drain, into a pipe, after that…? Sewage works Rivers and the sea How can we reduce the amount of water we use? Don't let taps run when you are brushing your teeth Shorter showers Showers instead of baths Don't water the lawn in Summer What happens to our environment if there is not enough water? No water for people or animals No water for crops, so a lack of food No water for factories making products
14		Ideas for answers to questions. Where does energy come from for cooking? Electricity or gas BBQ, or wood/coal Can people choose what type of energy they use for cooking? Yes/No/Don't know. In the UK people often choose electricity or gas and variations eg electric air-fryer or slow cooker Sometimes a BBQ or outdoor pizza oven, and students probably know they can be smokey What types of energy cause more or less pollution? Students may be aware of burning oil, gas and coal being more polluting Renewable fuels can be less polluting such as solar, wind, tidal to make electricity which is then used for cooking.
15		Ideas for answers to questions. Is it fair that access to the internet depends on which country you are in? Students may also talk about whether they should or should not have smartphones Can you name a country that has a developing economy? The following pages have links to interactive UN online materials that show the globe divided into different areas according to regional groups and economies

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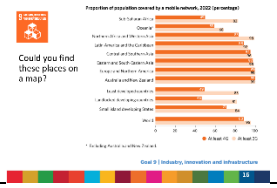
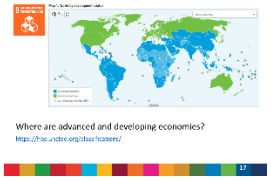
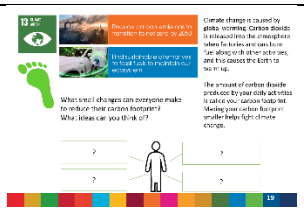
16		If you want to show students a world divided into areas described in the UN SDG report, go to: https://unstats.un.org/sdgs/indicators/regional-groups/
17		If you want to show students a world divided into economies described in the UN SDG report, go to: https://hbs.unctad.org/classifications/
18		<u>Ideas for answers to questions.</u> <u>What would your day look like without plastic?</u> What are plastic bottles use for? Food and drink storage because they are lightweight and keep food and drink in good condition Lots of things around the home like kettles, tools, toiletries <u>How can you reduce waste?</u> Buy less. Re-use more for example have a reusable drinks bottle rather than buying single-use plastic bottles <u>How can you recycle more?</u> Use recycling bins and throwing materials into landfill that could be recycled. What happens to our waste? Waste is sometimes exported or burned as well as being recycled 90 billion pieces of plastic divided by 68 million people = 1,323.5 pieces of plastic per person per year, so 3.6 pieces of plastic per day. 1 billion = 1 thousand million There are many different ways of measuring waste and recycling, so it can be difficult to compare difference pieces of research.
19		Understanding of global warming and climate change will vary for students although many will have met some of these topics broadly through science or geography. If you want to explore this topic further with your students, especially if this is outside of your subject specialism, there are many resources available online including at BBC Bitesize, National Geographic and World Wildlife Fund suitable for a range of ages. Empty boxes shown, so students can generate ideas.

Slide number		Presentation Notes
20		Suggested answers, students will have others. Ideas for reduce, reuse and recycle: Bring a re-usable water bottle to school Recycle plastics and other materials (cardboard, paper, metal, glass, plastic bags and so on) Only buy what you need Ideas for using less energy at home or school: Turn the thermostat down Turn off lights and devices off when not being used Don't leave phones charging or screens switched on overnight Ideas to reduce food waste or grow your own: Try to buy food produced locally (to reduce the amount it travels) Reduce food waste, only take what you need Try growing your own vegetables or fruit Ideas for change the way you travel: Take a bus, cycle or walk if you can Using electric cars
21		What do you think all of us could do to work towards the Sustainable Development Goals? Use as a prompt to think about differences that individuals or larger groups of people could make. You can expand this activity to produce a poster, collage or other artwork to present their ideas.
22		**Challenge 1** What do you think each of these young people need from the Sustainable Development Goals? Use as a prompt to think about differences around the world. Top left: living in a dry, remote, farming community: water and food security, access to health services. (Ethiopia) Top right: living in an arctic region, effects of global warming, food security, access to health services. (Nadym, Russian Arctic) Bottom left: living in a region where waste is imported or dumped, reduce, reuse, recycle. (Thailand) Bottom right: living in a crowded city with poor air quality, clean energy.

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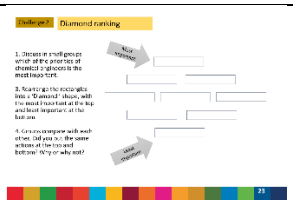
23		**Challenge 2** 1. Diamond ranking activities help students think about the importance they place on different values. 2. Cut out the rectangle on the rectangles on the next page. 3. Students discuss in small groups which of the priorities of chemical engineers is the most important. 4. Then rearrange the rectangles into a 'Diamond ' shape, with the most important at the top and least important at the bottom. 5. Groups compare with each other. Did each group put the same values at the top and bottom? Why or why not? Students are likely to find it difficult to prioritise as they are all important. It may be helpful to go back to the photographs in Challenge 1 and ask students to do the same activity but thinking about one of the young people featured in the photographs and where they live.
24		Copy for cutting out
25		**Challenge 3** Can be completed independently by students.

Please send any comments about this resource to DiscoverChemEng@icheme.org

Bibliography and Sources of information

Slide number	
4	United Nations definition of sustainable development, https://www.un.org/sustainabledevelopment/development-agenda/
11	United Nations (2023). The Sustainable Development Goals Report Special edition 2023. [online] Available at: https://sdgs.un.org/sites/default/files/2023-07/The-Sustainable-Development-Goals-Report-2023_0.pdf. Page 14
12	World Health Organization (2023). Billions left behind on the path to universal health coverage. [online] www.who.int. Available at: https://www.who.int/news/item/18-09-2023-billions-left-behind-on-the-path-to-universal-health-coverage. www.who.int. (n.d.). Coverage of essential health services (SDG 3.8.1). [online] Available at: https://www.who.int/data/gho/data/themes/topics/service-coverage. United Nations (n.d.). — SDG Indicators. [online] unstats.un.org. Available at: https://unstats.un.org/sdgs/report/2020/goal-03/.
13	United Nations (2023). The Sustainable Development Goals Report Special edition 2023. [online] Available at: https://sdgs.un.org/sites/default/files/2023-07/The-Sustainable-Development-Goals-Report-2023_0.pdf. Pages 24-25
14	United Nations (2023). The Sustainable Development Goals Report Special edition 2023. [online] Available at: https://sdgs.un.org/sites/default/files/2023-07/The-Sustainable-Development-Goals-Report-2023_0.pdf. Pages 26-27
15	Strategies Towards Universal Smartphone Access Report Broadband Commission Working Group High-level Briefing. (n.d.). Available at: https://www.broadbandcommission.org/wp-content/uploads/dlm_uploads/2022/09/High-level-Briefing-Smartphone-Access-Report.pdf [Accessed 15 Jul. 2024]. United Nations (2023). The Sustainable Development Goals Report Special edition 2023. [online] Available at: https://sdgs.un.org/sites/default/files/2023-07/The-Sustainable-Development-Goals-Report-2023_0.pdf. Accessed 12/07/2024. Page 30 https://hbs.unctad.org/classifications/
16	If you want to show students a world divided into areas described in the UN SDG report, go to: https://unstats.un.org/sdgs/indicators/regional-groups/
17	If you want to show students a world divided into economies described in the UN SDG report, go to: https://hbs.unctad.org/classifications/
18	University of Portsmouth. (2024). *UK's largest plastic waste survey reveals 1.7 billion pieces of plastic packaging still being thrown away by households weekly*. [online] Available at: https://www.port.ac.uk/news-events-and-blogs/news/uks-largest-plastic-waste-survey-reveals-17-billion-pieces-of-plastic-packaging-still-being-thrown-away-by-households-weekly. Smith, L. (2024). Plastic waste. [online] Parliament.uk. Available at: https://researchbriefings.files.parliament.uk/documents/CBP-8515/CBP-8515.pdf. UK population can be searched for online, there are a number of live figures available for populations.
	United Nations (2023). The Sustainable Development Goals Report Special edition 2023. [online] Available at: https://sdgs.un.org/sites/default/files/2023-07/The-Sustainable-Development-Goals-Report-2023_0.pdf. Page 37
	University of Portsmouth. (2024). *UK's largest plastic waste survey reveals 1.7 billion pieces of plastic packaging still being thrown away by households weekly*. [online] Available at: https://www.port.ac.uk/news-events-and-blogs/news/uks-largest-plastic-waste-survey-reveals-17-billion-pieces-of-plastic-packaging-still-being-thrown-away-by-households-weekly. Smith, L. (2024). Plastic waste. [online] Parliament.uk. Available at: https://researchbriefings.files.parliament.uk/documents/CBP-8515/CBP-8515.pdf.