

UN Sustainable Development Goals Posters 11 to 14 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 11-14 years. There is also a version for 7-11 years old, 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

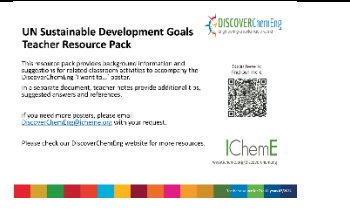
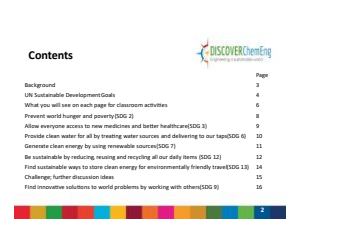
Science
Maths
Personal, social, health and economic (PSHE)
Citizenship and decision-making





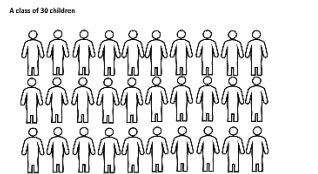
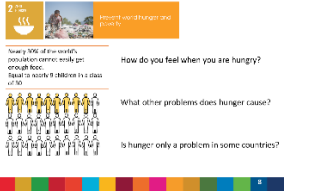
You may be aware of students in your class affected by some of the challenges highlighted in this resource, so you can tailor discussions as needed.

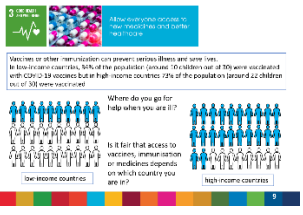
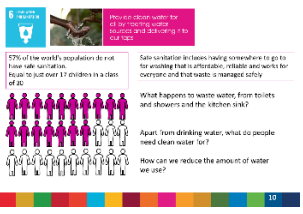
All references accessed July 2024, and links are provided at the end.

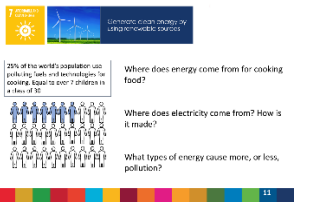
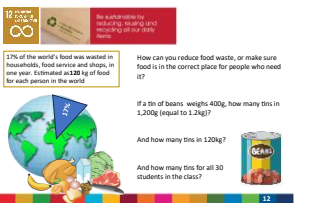

Timing



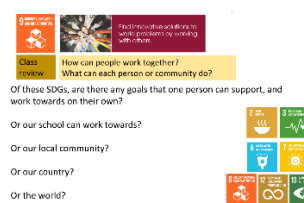
This can be run in one session taking around 60 minutes depending on your class, how many ideas and questions the students generate and available time. It can also be run as an introduction followed by bite-sized sessions taking each SDG in turn.

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

Slide number		Presentation Notes
3	 <p>Background</p> <p>The aim of this slide is to provide students with an overview of the role of chemical engineering in the world and to encourage them to consider the role of chemical engineering in their future.</p> <p>Chemical engineering is a discipline that involves the application of scientific and engineering principles to the design and operation of processes that convert raw materials into useful products. It is a multidisciplinary field that combines chemistry, physics, and engineering to create new materials, products, and processes.</p> <p>Chemical engineers play a vital role in many aspects of our lives, from the production of food and pharmaceuticals to the development of new materials and technologies. They are also involved in the design and operation of large-scale industrial processes, such as the production of oil, gas, and chemicals.</p> <p>Chemical engineering is a challenging and rewarding career that offers many opportunities for growth and development. It is a profession that is always evolving, and it offers a wide range of career paths and opportunities for innovation and discovery.</p>	<p>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/</p>
4	 <p>What are the UN Sustainable Development Goals (SDGs)?</p> <p>Sustainable development means giving people what they need now, without stopping people in the future having what they need.</p> <p>The United Nations Sustainable Development Goals (SDGs) are a set of 17 goals that are important for people and planet Earth.</p> <p>Examples of things that people should have the right to a clean standard of living, including: healthy food, clean water, places to live and work, education and healthcare.</p>	<p>There are 17 goals, and some of them link well to what chemical engineers are working towards.</p> <p>For the 2023 report, go to https://sdgs.un.org/sites/default/files/2023-07/The-Sustainable-Development-Goals-Report-2023_0.pdf</p>
5	 <p>It's time to...</p> <p>Chemical engineers can help to:</p> <ul style="list-style-type: none"> Improve the way we live and work Reduce the impact of climate change Improve the way we use energy Improve the way we use water Improve the way we use materials Improve the way we use land Improve the way we use air Improve the way we use food Improve the way we use transport Improve the way we use buildings Improve the way we use infrastructure Improve the way we use services Improve the way we use products Improve the way we use technology Improve the way we use innovation Improve the way we use research Improve the way we use development Improve the way we use progress Improve the way we use success Improve the way we use happiness Improve the way we use well-being Improve the way we use quality of life Improve the way we use future generations 	<p>If you would like additional posters, go to</p> <p>If you need additional posters, please email DiscoverChemEng@icheme.org and ask for the 'I want to...' poster.</p>
6	 <p>What you will see on each page for classroom activities</p> <p>1. Introduction: Describes how chemical engineers work towards the SDGs.</p> <p>2. Goal 1: No Poverty. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>3. Goal 2: Zero Hunger. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>4. Goal 3: Good Health and Well-being. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>5. Goal 4: Quality Education. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>6. Goal 5: Gender Equality. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>7. Goal 6: Clean Water and Sanitation. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>8. Goal 7: Affordable and Clean Energy. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>9. Goal 8: Decent Work and Economic Growth. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>10. Goal 9: Industry, Innovation and Infrastructure. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>11. Goal 10: Reduced Inequalities. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>12. Goal 11: Sustainable Cities and Communities. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>13. Goal 12: Responsible Consumption and Production. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>14. Goal 13: Climate Action. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>15. Goal 14: Life Below Water. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>16. Goal 15: Life on Land. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>17. Goal 16: Peace, Justice and Strong Institutions. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>18. Goal 17: Partnerships for Sustainable Development. Students learn that percentages, decimals and fractions are all ways of expressing proportions.</p>	<p>Through maths, students learn that percentages, decimals and fractions are all ways of expressing proportions.</p> <p>Very large numbers and statistics can be daunting, so, using the number 30 (often the number of children in a class) can make the proportions more relatable.</p> <p>You may be able to link numeracy and maths activities to SDGs in other ways.</p>
7	 <p>A class of 30 children</p> <p>30 children icons arranged in a grid.</p>	<p>You can use this slide to prompt the students to think about what different numbers means, when they hear about global issues.</p> <p>For example; if a problem impacts 50% of the global population, that would be the same as 15 out of 30 children in a class, or half the children.</p>
8	 <p>Report on Hunger and Health</p> <p>1. How many people in the world are hungry? (1 billion)</p> <p>2. How do you feel when you are hungry? (Rumbling tummy, Grumpy/hangry, Difficult to learn, Tired)</p> <p>3. What other problems does hunger cause? (Difficult to enjoy school, sport, Wider problems in a community)</p> <p>4. Is hunger only a problem in some countries? (Yes, it is)</p>	<p>Ideas for answers to questions. Encourage students to share their thoughts</p> <p><u>How do you feel when you are hungry?</u></p> <p>Rumbling tummy Grumpy/'hangry' Difficult to learn Tired</p> <p><u>What other problems does hunger cause?</u></p> <p>Difficult to enjoy school, sport Wider problems in a community</p> <p><u>Is hunger only a problem in some countries?</u></p> <p>There may be awareness of food banks or charity work locally or problems with food supplies elsewhere in the world</p>

Slide number		Presentation Notes
9	 <p>100 million people lack access to essential medicines and vaccines.</p> <p>In low-income countries, 50% of the population (around 1.5 billion) live without access to essential medicines and vaccines. In high-income countries, 2% of the population (around 120 million) live without access to essential medicines and vaccines.</p> <p>Where do you go for help when you are ill?</p> <p>Is it fair that access to vaccines, immunisation or medicines depends on which country you are in?</p> <p>low income countries high income countries</p>	<p>There are many indicators that link to this SDG and some are more challenging depending where you live in the world; including 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</p> <p>For this slide, 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.</p> <p>Health services means being able to see a doctor or nurse, go to hospital, get medicines, vaccines or something else to stay healthy.</p> <p><u>Ideas for answers to questions.</u></p> <p><u>Where do you go for help when you are ill?</u> Doctor / Nurse / Pharmacist Dentist / Optician Hospital Anyone/anywhere else...?</p> <p><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</p>
10	 <p>2.2 billion people lack access to basic sanitation.</p> <p>Safe sanitation is basic, having somewhere to go to for washing that is affordable, reliable and works for everyone and that waste is managed safely.</p> <p>What happens to waste water, from toilets and showers and the kitchen sink?</p> <p>Apart from drinking water, what do people need clean water for?</p> <p>How can we reduce the amount of water we use?</p>	<p><u>Ideas for answers to questions.</u></p> <p>Safe sanitation is a broad description including waste water facilities, it may be helpful to focus on one aspect; water for washing.</p> <p>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.</p> <p><u>Ideas for answers to questions.</u></p> <p><u>What happens to waste water, from toilets and showers and the kitchen sink?</u> Goes down the drain, into a pipe, after that...? Sewage works Rivers and the sea</p> <p><u>Apart from drinking water, what do people need clean water for?</u> Cooking / cleaning Washing yourself For things like a washing machine at home Swimming pools</p> <p><u>How can we reduce the amount of water we use?</u> <u>Don't let taps run when you are brushing your teeth</u> Shorter showers Showers instead of baths Don't water the lawn in Summer</p>

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11	 <p>25% of the world's population uses polluting, inefficient technologies for cooking. Equal to over 7 deaths in 10 hours.</p> <p>Where does energy come from for cooking food?</p> <p>Where does electricity come from? How is it made?</p> <p>What types of energy cause more, or less, pollution?</p>	<p><u>Ideas for answers to questions.</u></p> <p><u>Where does energy come from for cooking?</u> Electricity or gas BBQ, or wood/coal</p> <p><u>Where does electricity come from? How is it made?</u> Oil and gas power stations Nuclear power stations Renewables: wind, solar, wave, hydroelectric, geothermal, biomass</p> <p><u>What types of energy cause more or less pollution?</u> Students may be aware of burning oil, gas and coal being more polluting</p> <p>Renewable fuels can be less polluting such as solar, wind, tidal to make electricity which is then used for cooking.</p>
12	 <p>57% of the world's food was wasted in households, food service and shops, in one year. Estimated at 320 kg of food for each person in the world.</p> <p>How can you reduce food waste, or make sure food is in the correct place for people who need it?</p> <p>If a tin of beans weighs 400g, how many tins in 1,200g (equal to 1.2kg)?</p> <p>And how many tins in 120kg?</p> <p>And how many tins for all 30 students in the class?</p>	<p><u>Ideas for answers to questions.</u></p> <p><u>How can you reduce food waste, or make sure food is in the correct place for people who need it?</u> Don't buy more than you need Try to buy food that is grown locally and seasonal</p> <p>Maths activities can be demonstrated with a few tins of beans If a tin of beans is 400g, how many tins in 1,200g (equal to 1.2kg)? $1200 \text{ divided by } 400 = 3 \text{ tins}$ And how many tins in 120kg? $= 300 \text{ tins}$ And how many tins for all 30 students in the class? $300 \times 30 = 9,000$</p> <p>That's a lot of tins. You could show the children a few tins and ask them to imagine 300 then 9,000 tins.</p>
13	 <p>The Big Plastic Count (2021) found that 81% of household waste is plastic and 17% of that is single-use plastic. The UK's capacity to recycle is only 17% of those 100 bottles.</p> <p>What would your day look like without plastic?</p> <p>How can you reduce waste?</p> <p>How can you recycle more?</p>	<p><u>Ideas for answers to questions.</u></p> <p><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</p> <p><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</p> <p><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</p> <p>There are many different ways of measuring waste and recycling, so it can be difficult to compare difference pieces of research.</p>

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14	 <p>Climate change is caused by global warming. Carbon dioxide is released into the atmosphere when factories and cars burn fuel along with other activities, and this causes the earth to warm up.</p> <p>The amount of carbon dioxide produced by people daily in Britain is called their carbon footprint. Making your carbon footprint smaller is an important climate change.</p> <p>What small changes can everyone make to reduce their carbon footprint? What other ideas can you think of?</p> <p>Reduce, Reuse, Recycle</p> <p>Using less energy at home and school</p> <p>Reduce food waste or grow your own</p> <p>Change the way you travel</p>	<p>Understanding of global warming and climate change will vary among students. Many resources are available online including at BBC Bitesize, National Geographic and World Wildlife Fund for further activities.</p> <p><u>Ideas for reduce, reuse and recycle:</u> 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</p> <p><u>Ideas for using less energy at home or school:</u> Turn the thermostat down Turn off lights and devices off when not being used Don't leave phones charging or screens switched on overnight</p> <p><u>Ideas to reduce food waste or grow your own:</u> 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</p> <p><u>Ideas for change the way you travel:</u> Take a bus, cycle or walk if you can Using electric cars</p>
15	 <p>Challenge: What do you think each of these young people need from the Sustainable Development Goals?</p>	<p><u>What do you think each of these young people need from the Sustainable Development Goals?</u> Use as a prompt to think about differences around the world.</p> <p>Top left: living in a dry, remote, farming community: water and food security, access to health services. (Ethiopia)</p> <p>Top right: living in an arctic region, effects of global warming, food security, access to health services. (Nadym, Russian Arctic)</p> <p>Bottom left: living in a region where waste is imported or dumped, reduce, reuse, recycle. (Thailand)</p> <p>Bottom right: living in a crowded city with poor air quality, clean energy.</p>
16	 <p>How can people work together? What can each person or community do?</p> <p>Of these SDGs, are there any goals that one person can support, and work towards on their own?</p> <p>Or our school can work towards?</p> <p>Or our local community?</p> <p>Or our country?</p> <p>Or the world?</p>	<p>Although this relates to SDG 9, it come at the end of this activity to encourage students to think about solving problems together, to help all the other sustainable development goals.</p> <p><u>What do you think all of us could do to work towards the Sustainable Development Goals?</u></p> <p>Use as a prompt to think about differences that individuals or larger groups of people could make.</p> <p>You can expand this activity to produce a poster, collage or other artwork to present their ideas.</p>

Bibliography and Sources of information

Slide number	
4	United Nations definition of sustainable development, https://www.un.org/sustainabledevelopment/development-agenda/
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