

CHEMICAL ENGINEERING WITH PROF CHRIS JONES

TALKING POINTS

- 1) What is the difference between climate change and global warming? (See the very start of the article and read more about this here: <https://www.climate.gov/news-features/climate-qa/whats-difference-between-global-warming-and-climate-change>)
- 2) What is 'direct air capture'? How is this different from conventional carbon capture? (See *What is Professor Chris Jones doing to tackle climate change?*)
- 3) How is conventional acid-base chemistry used to capture carbon dioxide (CO₂) in Chris' direct air capture device? (See *What's the chemistry?*)
- 4) What is the importance of the aluminium oxide honeycomb in Chris' device? (See *How does Chris' DAC technology work, exactly?*)
- 5) What happens to the CO₂ once it has been captured? (See *What happens to the carbon?*)
- 6) How will DAC technology ease the transition to renewable energy sources? (See *When will DAC be ready to use?*)
- 7) What is a chemical engineer? (See *About Chemical Engineering*)
- 8) What skills do you need to be a good chemical engineer? Do you have any of these skills? (See *About Chemical Engineering*)

ACTIVITIES YOU CAN DO AT SCHOOL, COLLEGE OR AT HOME

1. Chemical engineering is all about developing problem-solving products. In groups, think of a problem. Now come up with some solutions to that problem. Be as creative as you can, just like a chemical engineer!

Here are some ideas from Science Buddies to get you started:

- Invent a new formula for bubble gum that makes it easy to blow bigger bubbles
- Find a way to use recycled plastic bottles to make fashionable fabrics
- Make substances that fluoresce different colours at different temperatures
- Make new fuels to propel spaceships further and faster

These suggestions can be found at www.sciencebuddies.org

2. There are lots of simple CO₂ experiments you can do at home. For example, HooplaKidzLab suggests using soda and vinegar to produce CO₂:

<https://www.youtube.com/watch?v=F1lfxNMRK8k>

And students at Boddam Primary School in Scotland show us just how this works:

<https://www.youtube.com/watch?v=0SwPJUB3sdc>

3. Science Buddies describe a simple acid and base experiment that you can do at home to test the pH of various household solutions. The experiment uses red cabbage juice as a pH indicator. Simply grate a red cabbage, add boiling water and leave for 30 minutes. Strain to remove the pulp, squeezing out all of the liquid. And there you have it, a pH indicator! Red cabbage contains a pigment molecule called flavin, which is purple at neutral pH, red at low (acidic) pH and yellow at high (basic) pH. What acids and bases can you find? We hope you like cabbage!!

https://www.sciencebuddies.org/science-fair-projects/project-ideas/Chem_p013/chemistry/make-cabbage-ph-indicator#summary

4. If you would like to find out more about the theories of acids and bases, Khan Academy has lots of really good videos and tutorials:

<https://www.khanacademy.org/science/chemistry/acids-and-bases-topic>