



NET ZERO: LESSON PLAN

Welcome

The Climate Action Toolkit is a set of enriching and engaging classroom activities designed and tested by Cambridge University for Y5-6 pupils (9-11 years old) to explore the urgent topic of climate change. 5 hour-long lessons have been designed by experts from across the University of Cambridge and tested in primary schools.

Session Aim

This aims to get pupils to understand that greenhouse gases, including carbon dioxide, CO₂, is important in causing climate change. There are many sources and sinks of greenhouse gases. When the amount of greenhouse gases adsorbed by the sinks is equal to that produced by the sources is in balance this is called net zero.

Pupils will also discover real-world solutions to reduce and remove CO₂, connecting the science to practical actions they can take individually and the larger, collective actions needed by communities, organisations and governments needed to reach net zero.

Lesson Plan

Activity	Guidance	Resources Needed	Time
01 Starter Net Zero	<p>This activity aim to introduce these concepts in brief:</p> <ul style="list-style-type: none">• What are Greenhouse gases?• Why are they causing climate change?• What is net Zero? <p>How to facilitate: Read the information below to pupils. There are 8 phrases. Each matches a picture. Pupils put the pictures in order.</p> <p>Mini whiteboard option: This uses just the slides, no printing required. Ask pupils to write numbers 1-8. Then as the story is read out, they match the letter of the picture they think link with that part of the story.</p> <p>Worksheet option: This is recommended if you want to extend this activity (optional). There is space on the worksheet to write captions for each picture.</p> <ul style="list-style-type: none">• Carbon dioxide, or CO₂, is a gas that we can't see. It is always in the air around us.• CO₂ is called a greenhouse gas. It is all around the earth, wrapping it up like a big blanket.	<p>Mini white boards or paper</p> <p>(optional: worksheets with images on them)</p>	5 min





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- Imagine, you're wrapped up in a warm blanket on a cold day? It feels cozy, doesn't it? Well, just like a blanket keeps you warm by holding in your body heat, CO₂ traps heat from the Sun. A little CO₂ is natural and if we have just the right amount in the air, it keeps the Earth warm enough to live, but without getting too hot or too cold.
- But imagine if the blanket kept getting thicker and thicker—it might get too hot and uncomfortable. At the moment, there is too much CO₂, the blanket is too thick and the Earth is getting too hot!
- Climate change happens when the Earth gets too warm. It can lead to big problems, like more storms, dangerous extreme weather, and rising sea levels.
- Greenhouse gases, including CO₂, come from lots of different things that people do, including our homes, the transport we use to get around and the factories we use to make all the things we have. They come from things that people do every day, like driving, eating or using electricity. A lot of CO₂ comes from burning fossil fuels like coal and the gas used to heat homes and make electricity. CO₂ also comes from the petrol and diesel most cars and lorries use to drive.
- But there's good news! Plants, trees, and oceans help take CO₂ out of the air. Plants and trees use CO₂ to grow, and oceans also soak up CO₂ it to keep the air balanced.
- We can do things to reduce the amount of CO₂ in the air and help slow down climate change. We can help by doing these 2 things: 1) putting much less CO₂ into the air and 2) finding ways to take some of it out of the air. When the CO₂ we add is balanced with the CO₂ we take out, we reach something called net zero.

Follow-up (optional). Get pupils to take turns to explain the pictures in order.

Extension (optional): get pupils to write captions for the images in the right order. Like a comic strip. Only extend if you want to make this lesson a longer session.





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02 Activity Sources and Sinks

The concept to get across here is that there are activities that produce CO₂ and activities that use up CO₂. These are called sources and sinks. There are big, global sources and sinks, and small ones. This means that big, global changes are needed as well as changes at a community, family and individual level.

We are aiming to reach net zero. This is when the flow of CO₂ into sources and sinks is in balance. At net zero, we are taking as much CO₂ out of the air as we are putting in.

Resources

You have a set of source and sink cards. There are 45 total and can be printed on 5 sheets of A4, 9 cards on each.

There is 1 sheet each of:

- Big sources,
- Big sinks,
- Small sources,
- Small sinks
- Plus 1 sheet of mixed extras.

Our recommendation is to use the first 4 pages. However, there are extras on the 4th page, so that you have enough to choose replacement cards if there are any in the original 4 that you do not feel are appropriate for your class.

Activity

These cards can be used in a variety of ways.

Our suggestion for facilitating is:

- Shuffle 1 deck of cards (first 4 pages = 36 cards) Give every pupil 1 card **Activity 1:**
- sort into sources or sinks. This can be done
- by getting pupils to go to one side of the room for sources, one side for sinks. Get pupils to swap cards randomly **Activity 2:**
- sort into large impact and small impact.
- This doesn't matter if it is a source or a sink,
- just the size of the impact. (optional) can swap cards and repeat, cycling between source/sink and big/small. Or split to 4 groups based on the combination of the
- categories: big source, small source, big sink, small sink

Source/sink cards

10 min





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	<ul style="list-style-type: none">• Activity 3: Put in order from worst to best for the environment. This could be done as a whole class activity. Or lead into it from the 4 groups, and then get them to order themselves within those 4 groups. Gather the deck of cards in <p><u>Lower movement alternatives:</u> Instead of getting pupils to move places in the room, you could get them to make a symbol, eg. arms up to make an arrow for 'source'. Arms cradled in front to make a sink shape for 'sink'.</p> <p>This could also be done as a card sort activity to put into groups or sort into order. If doing this style, then print 1 set of cards per group. Or give a smaller subset of the cards to each group of pupils.</p>		
03 Activity Net Zero Balance	<p>To reduce the impacts of climate change and stop it from getting any worse, we need to reach net zero. This is where the sources that make CO₂ are balanced by the sinks that adsorb CO₂.</p> <p>This activity get pupils to understand that there are many ways to reach net zero. And that different actions have different size impacts.</p> <p>How to facilitate:</p> <ul style="list-style-type: none">• Start with the slide with the picture of the scales/balance.• Give each group/table 1 deck of cards. If you think a whole deck is too much. Then you could get each group to divide them at random so they have a smaller pool each.• Pupils asked to find a way to balance the CO₂ source on the board. This is a +40, Power stations that use fossil fuels. Can they balance using 1 card?• Can they balance using more than 1 card?• Extension: How many ways can they find to balance it?	Source/sink cards	10 min





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	<ul style="list-style-type: none">• Repeat activity with a greater CO₂ score. Teacher could do this by dealing 2 cards at random. Currently we use power from power stations, and also get products from far away. $40 + 25 = 65$ total CO₂.• How can we balance this? <p>Follow-up. Ask pupils some questions about net zero. Aim to get them to tie together the story of CO₂ from the start of the lesson with the sources and sinks. Too many sources and not enough sinks means that we experience climate change.</p> <p>These are some suggestions of questions:</p> <ul style="list-style-type: none">• Which actions helped us reach net zero the fastest?• Why do we need big actions to make a big difference?• What are some big actions communities can take to reduce CO₂?• How can small actions at home and in daily life make a difference?• What might happen if we only took small actions?• Why do we need both big and small actions to reach net zero?• How can small actions support big changes?		
04 Activity Fact or Fiction	<p>This true/false quiz activity will help students identify common misconceptions about CO₂, the environment, and climate change, reinforcing correct information through a fun game.</p> <p>Facilitation suggestions (choose 1):</p> <p>1. Use set of cards with statements and with answers. Hand out to class so that everyone has one statement and answer. Teacher calls on class member to read a numbered statement. Class votes on whether they think it is true or false. Then the pupil with the answer card for that statement reads it out.</p>	Set of cards with statements and answers	10 min





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	<p>2.</p> <p>Scavenger hunt. Print the quiz sheets with the true/false statements. Each pupil has one. Give time to tick true or false for each. Now swap coloured pen, and pupils go around the room to find the answers that are printed and placed around the classroom.</p> <p>3.</p> <p>Quiz: Could do with the answer sheet or mini white board. If using mini white board, number 1-10 along the side, and tell students they will be writing True or false. Alternatively, at this point you could get pupils active by getting them to go to different locations in the room for true or false, or stand up and put hands on heads or hands on hips.</p> <p>4.</p> <p>There are many misconceptions, so you can pick out ones that you think apply most to your class.</p> <p>Extension: If doing an option where pupils are working self-pace, for each of the statements, decide if it is talking about an individual or large impact source/sink.</p> <p>Follow with discussion questions:</p> <ul style="list-style-type: none">• Which statement surprised you the most. Why did you think something different at first? How could we help others• understand the truth about this statement?		
<p>05 Plenary Posters</p>	<p>This activity is to help others understand the truth about climate misconceptions, and reinforce learning about any misconceptions from the previous activity.</p> <p>Each pupil, or group, chooses one misconception and correct answer and makes a poster about it to help explain to other people.</p> <p>Group size: This could be an individual or group activity. We suggest a group activity could be good, each person contributing something different.</p>	<p>1 piece of plain paper per student</p> <p>Pencils/pens are fine.</p> <p>Can do black and white, or colour. The challenge with using colours would be in not letting anyone make their posters too perfect.</p>	<p>10 min</p>





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	<p>There are slides for 2 alternative, similar activities. Pick the one you think will engage your group the most.</p> <p>Alternative 1: posters. Show an example of effective poster layouts.</p> <p>Alternative 2: This could also be run as an activity to make a social media post. This is a smaller version of the activity if you have less time.</p>		
06 Plenary Optional	<p>Pair and share: Each pupil takes turns to explain their poster or post with one other person in the class, then swap (1 min per pupil suggested, then 1 min for questions).</p> <p>Walking gallery: if appropriate for your class, you could make a "Walking Gallery" of your posters, either as a whole class or in smaller groups eg. Tables. If wanted, pupils could give feedback on posters to a few posters.</p> <p>Present: pick a few people from the class to show their work to everyone</p>	(optional) Post it notes for feedback if doing walking tour	5 min

