






NET ZERO

TEACHER / FACILITATOR PACK

Materials developed on behalf of the Royal Air Force to support Glasgow Science Centre Learning Lab.

Materials appropriate for P5 - P7 pupils.



 Lesson objective	To learn what Net zero means and how we reach it. To learn about how climate change is affecting our planet and how we can prevent this by reaching net zero.
 Duration	Approximate total duration of all activities in this resource pack: 1.5 hours. Indicative timings provided for each component.
 Context to set the scene for the session	Net zero means reaching the balance between the amount of greenhouse gas emitted into the atmosphere and the amount removed. Burning fossil fuels releases greenhouse gases into our atmosphere causing climate change and the planet to get warmer. This is causing more extreme weather. If the planet increases by 1.5 degrees people will be unable to grow food and will go hungry. To stop climate change scientists say we need to reach net zero emissions by replacing polluting technology with new, greener technology. We can remove polluting gases by planting trees that capture the gases. We need to achieve this balance to make a better future for everyone, where we power buildings with green energy and drive environmentally friendly cars.



Welsh curriculum links

This activity provides links to experience and outcomes in a number of subject areas covered by the National Curriculum for Wales *Science in the national curriculum for Wales: key stages 2 to 4*. Specifically, these include:

Knowledge and Understanding of the World Children should experience the familiar world through enquiry, investigating the indoor and outdoor environment in a safe and systematic way. They should be given experiences that help them to increase their curiosity about the world around them and to begin to understand past events, people and places, living things, and the work people do. Using all their senses, they should be encouraged to enjoy learning by exploration, enquiry, experimentation, asking questions and trying to find answers. They should learn to demonstrate care, responsibility, concern and respect for all living things and the environment. They should develop and communicate an increasing range of appropriate vocabulary. They should learn to express their own ideas, opinions and feelings with imagination, creativity and sensitivity. The children's skills should be developed across all Areas of Learning through participation in experiential learning activities and through using sources such as stories, photographs, maps, models and ICT (**page 10**).

Careers and the world of work Science contributes to careers and the world of work by enabling learners to study a range of applications of science, medicine and technology in their everyday life and in the wider world. This gives learners insight into how scientists work and also develops experimental and generic skills needed for the world of work (**page 9**).

Developing thinking Learners develop their thinking across the curriculum through the processes of planning, developing and reflecting (**page 6**).








Developing communication Learners develop their communication skills across the curriculum through the skills of oracy, reading, writing and wider communication (**page 6**).

Developing ICT Learners develop their ICT skills across the curriculum by finding, developing, creating and presenting information and ideas and by using a wide range of equipment and software (**page 7**).

Developing number Learners develop their number skills across the curriculum by using mathematical information, calculating, and interpreting and presenting findings (**page 7**).



Pupil resources

-  Introductory explainer
-  Net Zero Factsheet
-  Worksheet: Definitions
-  Worksheet: Net Zero wordsearch
-  Worksheet: Net Zero means balance
-  Worksheet: Design a Net Zero village
-  Worksheet: Net Zero quiz



Hook into the lesson (10 mins)

Play  **INTRODUCTORY EXPLAINER.**

Additional context

Net zero means reaching the balance between the amount of greenhouse gas emitted into the atmosphere and the amount removed. Greenhouse gases are mainly caused by burning fossil fuels such as coal, oil and gas.


Releasing greenhouse gases into our atmosphere is causing climate change and the planet to get warmer.

To stop climate change scientists say we need to reach net zero emissions by replacing polluting technology with new, greener technology. We can remove polluting gases by planting trees that capture the gases.

We can reduce our carbon footprint by following the 5 R's – Refuse, Reduce, Reuse, Rot, Recycle.


We need to achieve net zero by powering buildings with green energy, eating less meat and using environmentally friendly fuels.


Scotland is aiming to become the first UK nation to reach Net Zero by 2045.

Provide pupils with a copy of  **Net Zero FACTSHEET.**



Activity (10 mins)

 Ask pupils to think of some good ways to reach net zero (e.g. Planting more trees, Solar energy, Electricity, Wind power, New green technology, Biofuels)

Lead a discussion with pupils that explores some of the key terms used when discussing Net Zero. Provide pupils with  **Worksheet: DEFINITIONS.** (Answers: Carbon footprint = A, Recycle = E, Food Miles = B, Sustainable Fuel = C, Upcycle = D, Emissions = F)



Activity
(25 mins)

? Ask pupils to think of some bad things that are contributing to climate change (e.g. Burning fossil fuels like oil, gas and coal, Old technology, Emitting greenhouse gases, Cutting down forests)

Provide pupils with a copy of [Worksheet: NET ZERO WORDSEARCH.](#)



Provide pupils with a copy of [Worksheet: NET ZERO MEANS BALANCE.](#)



Activity
(25 mins)

? Ask pupils to think about the carbon footprint caused by taking a trip to the supermarket. (e.g. Car journey, staff travel to work, food miles, heating and lighting of supermarket building etc.)

Provide pupils with a copy of [Worksheet: DESIGN A NET ZERO VILLAGE.](#)

**Activity**
(20 mins)

? Ask pupils to name the 5 R's for reducing their carbon footprint:
REFUSE: Say no thank you to single-use plastics.
REDUCE: Just buy what you really need.
REUSE: Keep your things in great condition and repair or upcycle it when it breaks.
ROT: Set up a compost heap for your food scraps or put them in the food recycle bin.
RECYCLE: Recycle any plastic, paper, glass or metal.

Provide pupils with a copy of [Worksheet: NET ZERO QUIZ](#).

ANSWERS:

Q1: What do we mean by net zero?

A: Reaching the balance between greenhouse gas emitted and gas removed.

Q2: What is climate change?

A: Our planet heating up.

Q3: Choose three of these which are helpful for reducing our carbon footprint

A: Recycle, Reuse, Rot.

Q4: What is solar power?

A: Power from the sun's rays.

Q5: When does Scotland want to reach net zero?

A: 2045.

Q6: By what year does the RAF want to power their aircraft with sustainable fuels?

A: 2050.

Q7: What does drought mean?

A: Serious shortage of water.

Q8: How many hectares of trees does the Forestry Commission want to plant by 2050?

A: 1 million.

Q9: Which of these contribute to damaging our climate? (Choose more than one)

A: Burning fossil fuels, Running power stations.

Q10: What is greenhouse gas?

A: Gas that lets sunlight pass through to earth, but prevents the heat from leaving the atmosphere.



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CONTEXT AND EXAMPLES

More [information](#) about the five ways to reduce your carbon footprint.



REDUCE YOUR CARBON FOOTPRINT

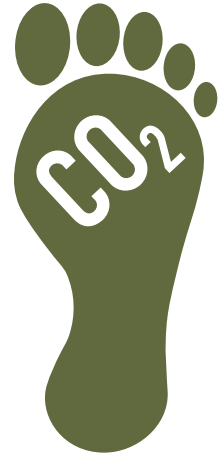
REFUSE: Say no thank you to single-use plastics.

REDUCE: Just buy what you really need.

REUSE: Keep your things in great condition and repair or upcycle it when it breaks.

ROT: Set up a compost heap for your food scraps or put them in the food recycle bin.

RECYCLE: Recycle any plastic, paper, glass or metal.



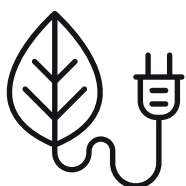
SCOTLAND AND NET ZERO

Scotland is aiming to become the first UK nation to reach Net Zero by 2045.

Scotland's greenhouse gas emissions fell by 31% from 2008 to 2018. This is faster than any other nation of the UK and any G20 nation over the same period.

Scottish renewable energy use has tripled, and fossil-fuel use has fallen by more than 70% in the last decade.

The G20 (Group of 20) comprises 19 countries and the European Union. The 19 countries are Argentina, Australia, Brazil, Canada, China, Germany, France, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom and the United States.



[Read more](#) about Scotland's plans for Net Zero.





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CONTEXT AND EXAMPLES



ROYAL AIR FORCE

RAF AND NET ZERO

To reach net zero the RAF are planning to use sustainable biofuels by 2050 in their fighter jets and helicopters. The aircrafts will be powered by fats and oils, wood waste, household waste, organic matter and seaweed.

More information on [Future Net Zero](#) website.



Forestry Commission

FORESTRY COMMISSION - REACHING NET ZERO

The [forestry commission](#) is the government department responsible for protecting and expanding the sustainable management of woodlands. They are committed by law to reach net zero emissions by 2050. To do this they need to plant more trees urgently. They are aiming to plant a million hectares of new woodland in the UK by 2050. That is a lot of trees. If it were all in one place (which of course it won't be) that would mean a new forest the size of Norfolk and Suffolk together.



LEAD POLLUTION

Lead was once added to petrol. But scientists found out that it caused air pollution and made people very poorly. Small amounts of lead could also be absorbed by plants and trees, but it was decided to stop using lead for safety purposes.

Net Zero [YouTube video](#) outlining the issues from a child's perspective.

