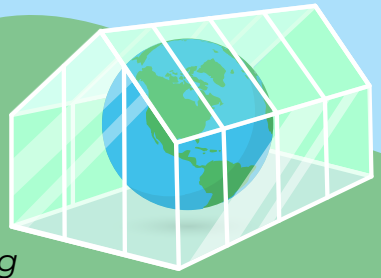


Welcome to OpenUpScience

from Cambridge Science Centre.



This issue is all about the **Climate Crisis.**



Why Is Climate Change So Bad?

Unfortunately climate change doesn't mean more sunny days at the beach. Some consequences are..

Failed food crops

More extreme weather with devastating consequences.

Ocean acidification

Forest fires

High extinction levels

Drought

Ice caps melting

Flooding

Habitats of animals destroyed

...and more.

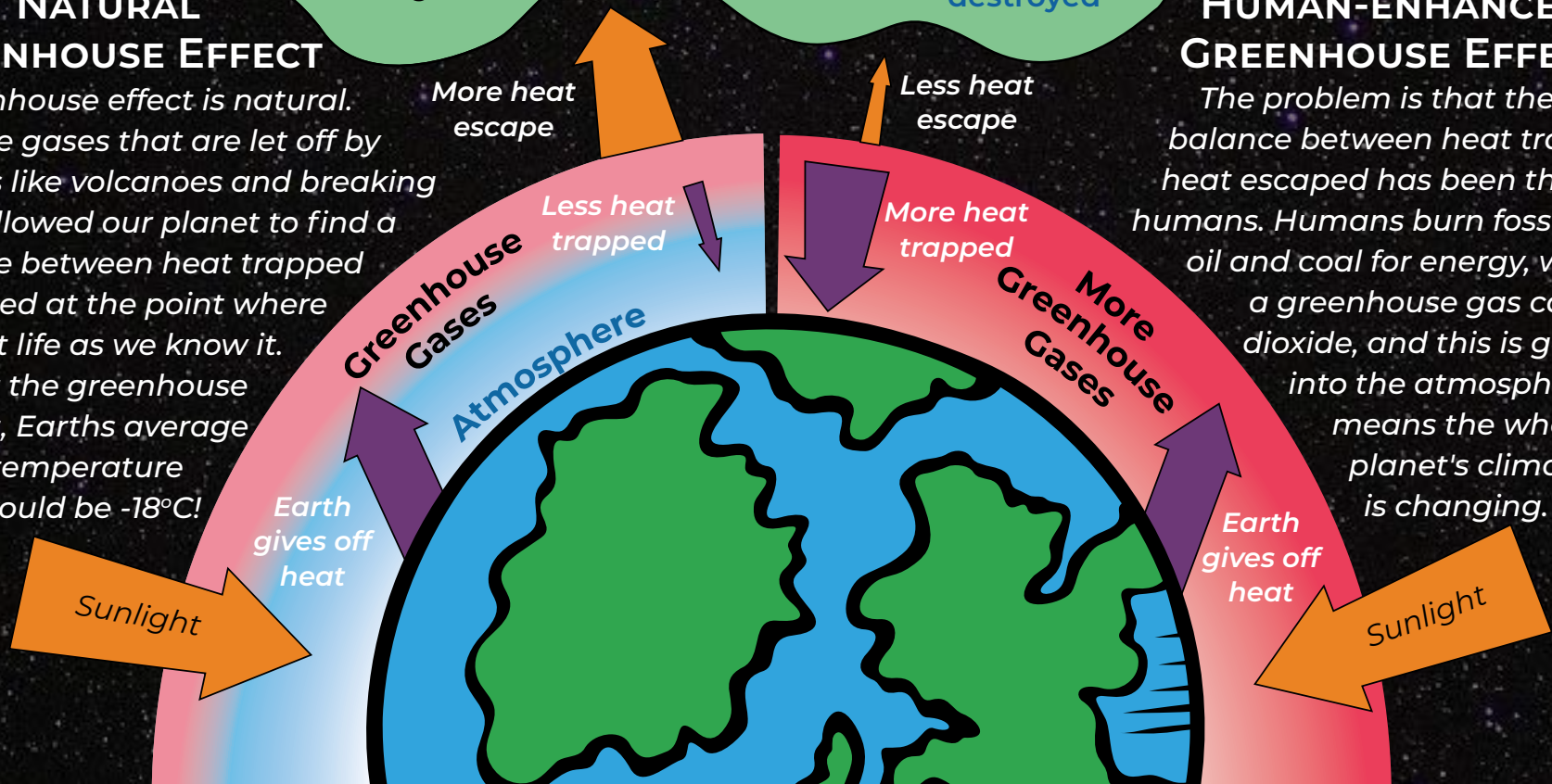
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Our planet is warming up because of the greenhouse effect. The greenhouse effect is when certain gases in our atmosphere trap heat, which makes the Earth warm. Think about putting something in a greenhouse. It heats up during the day in the sunshine and stays warm overnight.

NATURAL GREENHOUSE EFFECT

The greenhouse effect is natural. Greenhouse gases that are let off by natural sources like volcanoes and breaking down plants allowed our planet to find a natural balance between heat trapped and heat escaped at the point where it could support life as we know it.

Without the greenhouse effect, Earth's average temperature would be -18°C !



HUMAN-ENHANCED GREENHOUSE EFFECT

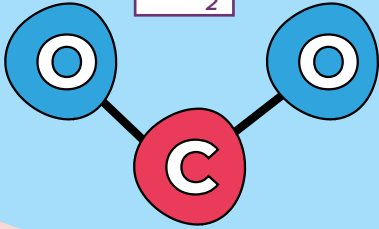
The problem is that the natural balance between heat trapped and heat escaped has been thrown off by humans. Humans burn fossil fuels like gas, oil and coal for energy, which releases a greenhouse gas called carbon dioxide, and this is getting pumped into the atmosphere. This means the whole planet's climate is changing.

Meet The Greenhouse Gases

There are three main greenhouse gases...

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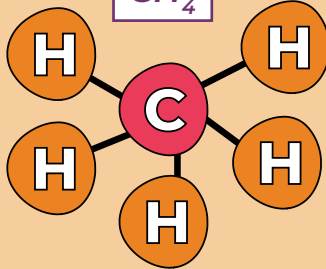
CARBON DIOXIDE



Made from carbon and oxygen, carbon dioxide is made naturally from decaying organisms and volcanoes. **Humans are releasing CO_2 when burning fossil fuels to make energy. It's the biggest factor in human-caused climate change.**

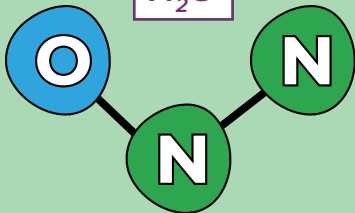
Made of carbon and hydrogen, methane is released from things breaking down in water. **Methane is also released from landfills, raising cows, other livestock and mining - which humans do a lot of! It is 80 times more warming than CO_2 and is the second biggest factor in human caused climate change.**

METHANE



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NITROUS OXIDE

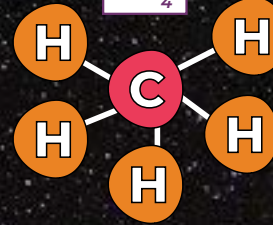


Nitrous oxide, made of nitrogen and oxygen, is naturally present as a part of Earth's nitrogen cycle made by bacteria in soil. **However, humans have changed the balance by releasing loads, mostly from growing food. It is 300 times more warming than CO_2 .**

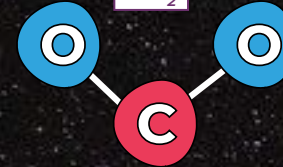
Match The Source To The Gas

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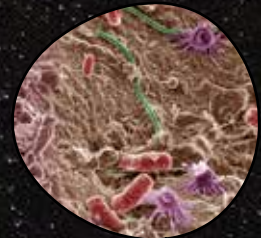
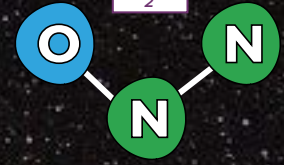
METHANE



CARBON DIOXIDE



NITROUS OXIDE



Solutions at the back

*Some of these sources will release other greenhouse gases as well as the ones we've outlined.

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What Are People Doing?!

It might seem scary, but it's not too late to stop climate change!



The climate crisis isn't due to the actions of individual people, but big companies that release tonnes and tonnes of greenhouse gases a year. Although you should try and minimise the amount of greenhouse gases you release, in order to save the planet we need these big companies to change...

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In November 2021, the UK will host the 26th event with world leaders called 'Conference of the Parties' (COP26) to talk about how to get climate change under control. It's set to be a big one, so keep an eye out for the results on the news!



UN CLIMATE CHANGE CONFERENCE UK 2021

IN PARTNERSHIP WITH ITALY

WHAT WOULD YOU WANT COUNTRIES TO DO TO MAKE THE PLANET A HAPPIER, CLEANER AND FAIRER PLACE TO LIVE?

Send your ideas to openupscience@cambridgesciencecentre.org

Countries have already signed an agreement to try to keep the global temperature rise to less than 2°C more than it was before we started releasing greenhouse gases

True
False

Melting Glaciers

With the planet heating up, icy glaciers are melting. What does this mean for our seas?



What to do

1. Get the rocks or playdough and place an even amount in one corner of each container.
2. (Optional) Colour some water with food colouring.
3. Pour water into each container so that they are a little under half full.
4. Using the permanent marker, mark the water level on the side of the containers.
5. Put half of the ice cubes in the water in one container and balance the other half of the ice cubes out of the water on the playdough or rocks in the other container.
6. When all the ice cubes have melted, mark the water level again on the side of the containers. *What do you notice?*

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What you'll need

- Two identical plastic containers
- Some playdough or rocks
- A permanent marker
- Ice cubes
- (Optional) food colouring



Image: NASA

What is happening?!

Melting of land ice in far away places raises the sea level world-wide! This is a big problem for people who live by the sea as their homes could be at a greater risk of flooding.



CAN YOU THINK OF ANY OTHER REASONS MELTING ICE IS A PROBLEM? SOME ARE REVEALED AT THE BACK OF THIS ISSUE.

Ocean Acidification



The oceans absorb around half the carbon dioxide that is given off by burning fossil fuels. When CO₂ dissolves in the seawater, a chemical reaction happens that makes *carbonic acid*. Investigate what this means for ocean creatures with this experiment.

What to do

1. Fill one glass halfway with water and fill the other halfway with vinegar. Vinegar is acidic.
2. Take a before photo of your shells.
3. Put one shell inside the water and one in the vinegar.
4. Check on the glasses after 10 minutes. What do you see happening?
5. Come back to your glasses after 24 hours and take the shells out. How do they look different? Take an after photo of your shells to compare.

What you'll need

- Two glasses
- Some white vinegar
- Two shells or some egg shell



What's happening?

Shells are made of calcium carbonate which breaks down in acid and starts to dissolve. The ocean isn't as acidic as the vinegar in this experiment, but even a small change in the acidity of the water will affect delicate organisms that live in our oceans like coral.



Climate Word Search



Can you find all the words?

W	G	N	I	D	O	O	L	F	L	N	D	A
M	E	L	F	E	E	T	A	M	I	L	C	O
E	G	A	I	F	N	R	I	F	M	I	A	E
T	I	R	R	O	C	E	M	A	D	P	R	R
H	W	T	E	R	E	D	R	I	E	L	B	F
A	E	O	S	E	O	M	F	G	F	A	O	A
N	T	W	S	S	N	I	E	S	Y	N	N	N
E	E	A	L	T	C	H	T	H	A	E	D	A
X	I	R	N	A	G	M	O	G	F	T	I	C
O	T	M	T	T	N	R	I	U	E	C	O	P
C	R	I	S	I	S	I	T	I	S	R	X	P
A	O	N	I	O	C	O	D	T	A	E	I	O
N	D	G	O	N	I	E	N	F	T	I	D	A
N	I	T	R	O	U	S	O	X	I	D	E	N

Climate Crisis
Greenhouse Carbon Dioxide Methane

Nitrous Oxide Acidification
Deforestation Energy Fires

Warming Planet COP Flooding

Solutions at the back

What Could The Future Look Like?

What will the world look like when we stop releasing so much greenhouse gas?



The air will be cleaner all around the world.

We won't rely on burning fossil fuels like coal, gas and oil for electricity, but instead will get our energy from renewable sources like wind power and solar panels.

Trees will be planted to take carbon dioxide out of the atmosphere through photosynthesis.

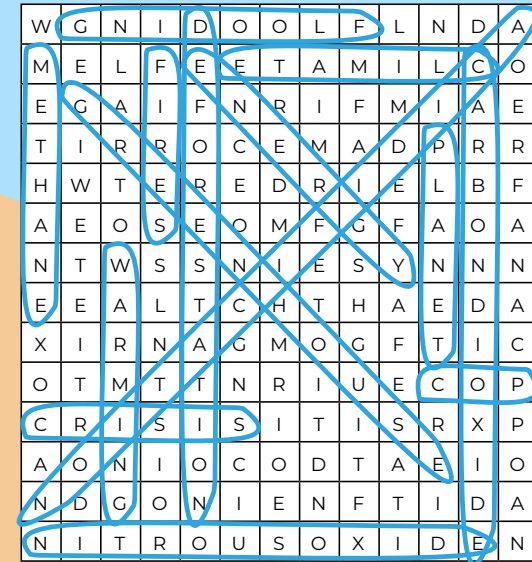
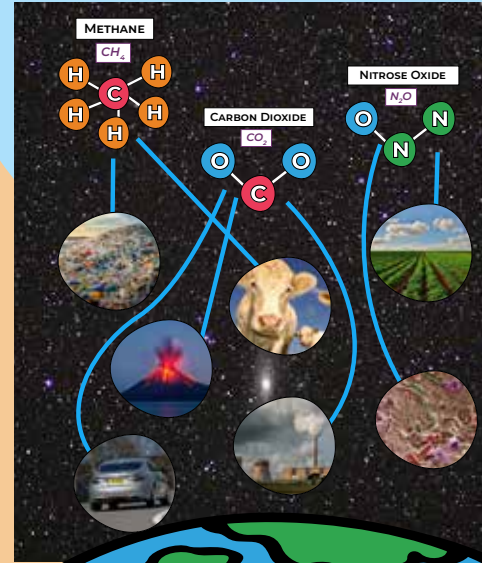
Vehicles will move to running off electricity instead of petrol or diesel.

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Puzzle solutions



If you have any questions or want to send us a photo of your experiments, drop us an email at openupscience@cambridgesciencecentre.org



Ice melting causes sea levels to rise. What are some other effects?

- Lots of animals live on the ice and rely on it to survive. The ice melting puts them in danger!
- Ever wondered why people wear light coloured clothing when it's really hot? White reflects lots of heat, whereas dark colours absorb heat. This means as the planet warms and the shiny white ice melts, the planet is reflecting less heat back into space!
- Buried deep inside the ice caps there are pockets of methane. As the ice melts, methane will be released into our atmosphere!



Countries have already signed an agreement to try to keep the global temperature rise to less than 2°C more than it was before we started releasing greenhouse gases

True

False

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Fuel, Illuminate**

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We always want to improve, so let us know what you liked - or didn't like - about this issue!

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