



## GREENHOUSE EFFECT

1. There are many different types of gas in the Earth's atmosphere. Some of these are known as 'greenhouse gases', because they keep our planet at a comfortable temperature. This is known as the 'greenhouse effect'.

Can you guess which of the below gases are greenhouse gases, and which are not?

OXYGEN (O<sub>2</sub>)

METHANE (CH<sub>4</sub>)

NITROGEN (N<sub>2</sub>)

WATER VAPOUR (H<sub>2</sub>O)

CARBON MONOXIDE (CO)

NITROUS OXIDE (N<sub>2</sub>O)

OZONE (O<sub>3</sub>)

CARBON DIOXIDE (CO<sub>2</sub>)

HYDROGEN CHLORIDE (HCl)

ARGON (Ar)

CHLOROFLUOROCARBONS (CFCs)

HYDROFLUOROCARBONS (HCFCs and HFCs)

GREENHOUSE GAS

NON-GREENHOUSE GAS



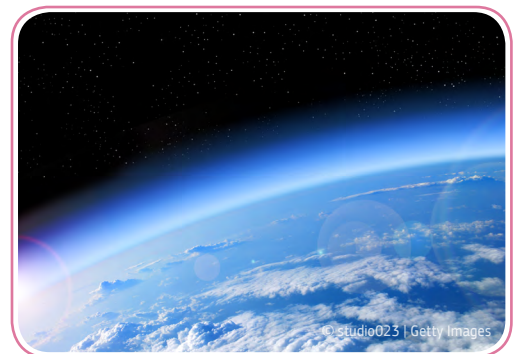
2. The ozone layer is a natural layer of gas in the upper atmosphere that protects humans and other living things from harmful ultraviolet (UV) radiation from the sun. However, powerful GHGs called chlorofluorocarbons damage the ozone layer, so in 1987 the international community adopted a treaty designed to phase them out. What is the name of this treaty?

THE MAASTRICHT PROTOCOL

THE KYOTO PROTOCOL

THE KINSHASA PROTOCOL

THE MONTRÉAL PROTOCOL



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### 3. True or false? Consider the following sentences:

Carbon is everywhere and in all living things. **TRUE / FALSE**

Carbon is completely static, remaining in one place for millennia. **TRUE / FALSE**

Carbon exists in the air only as a gas (carbon dioxide, or CO<sub>2</sub>). **TRUE / FALSE**

Oceans cannot absorb CO<sub>2</sub> as they are liquid and CO<sub>2</sub> is a gas. **TRUE / FALSE**

Human beings exhale carbon when we breathe. **TRUE / FALSE**

Dead plants and animals turn into carbon when they decompose, and are absorbed back into the Earth.

**TRUE / FALSE**

This process is referred to as the 'carbon circle'. **TRUE / FALSE**

Human activities are upsetting the delicate balance of carbon levels in the air, land and sea. **TRUE / FALSE**

Deforestation of tropical rainforests causes a build-up of carbon stores. **TRUE / FALSE**

Increasing levels of carbon dioxide (CO<sub>2</sub>) in the atmosphere cause increases in the Earth's temperature.

**TRUE / FALSE**

**4. The greenhouse effect (trapping of heat in the Earth's atmosphere) creates the temperature that sustains life on Earth (~15°C). With no greenhouse effect (i.e. if the Earth had no atmosphere) temperatures would be around -18°C. However, human activity is raising temperatures beyond the natural greenhouse effect due to emissions of gases such as carbon dioxide.**

Let's recreate the greenhouse effect.

#### HERE'S WHAT YOU'LL NEED

Two identical glass jars  
4 cups cold water  
10 ice cubes  
One clear plastic bag  
Thermometer

#### METHOD

Take two identical glass jars each containing 2 cups of cold water.

Add 5 ice cubes to each jar.

Wrap one in a plastic bag (this is the greenhouse glass).

Leave both jars in the sun for one hour.

Measure the temperature of the water in each jar.

#### Which is warmer?

The plastic acts like the greenhouse gases in the atmosphere. It traps some of the sun's energy as heat. This heat builds up inside the jar. Imagine this on a massive scale – this is what is happening to the Earth's atmosphere.