





Atmospheric Gases - Snap Game

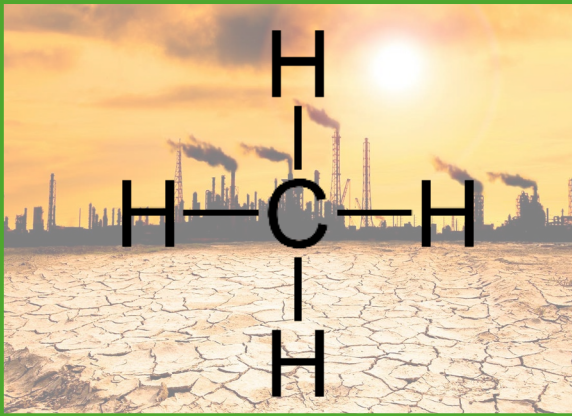
Symbols Key:

-  (Mostly) Human-driven
-  Greenhouse Gas
-  Ozone Depleter
-  Air Quality Impacts

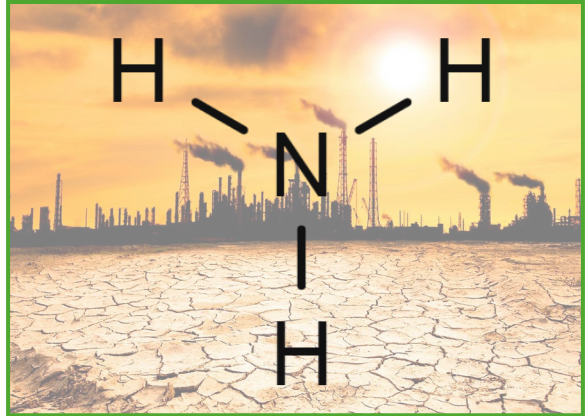
The Game: (2+ players)

- Print out at least 2 copies of pages 2 and 3 (otherwise there would be no snaps!). We recommend printing one set of cards per player. If you can print double-sided, the info cards will print on the back of the snap cards, instead of being separate.
- Shuffle and deal out the whole deck. Keep each pile face-down on the table.
- Take turns revealing the top card of your deck onto a discard pile in the middle.
- When two cards consecutively match, the first player to call out 'Snap!' either collects the cards into a pile to set aside (if playing with more than two) or gives their opponent the cards.
- The winner is either the person who 'gets out' first in a 2-player game, or the person with the most cards set aside once you've run out of cards.
- Common Snap Extensions:
 - Sandwich: Three cards match like B – A – B in a pile.

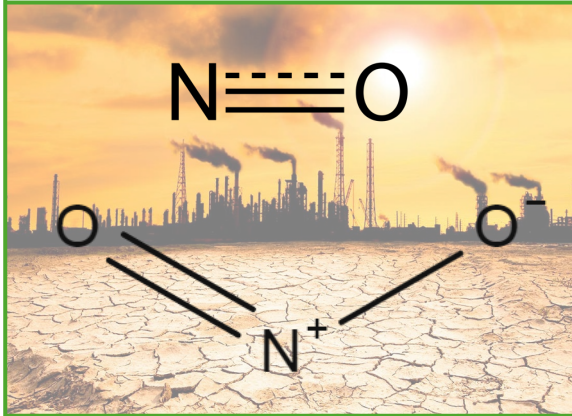
CH₄ - Methane



NH₃ - Ammonia



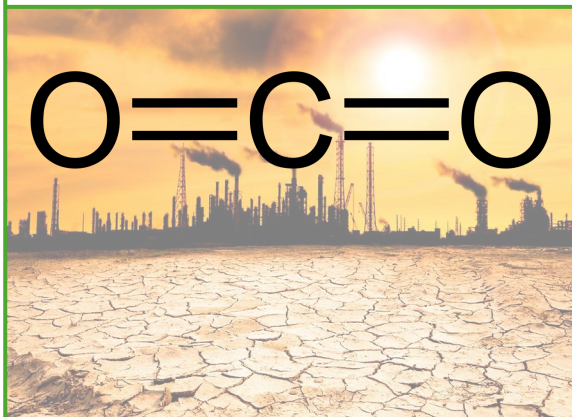
NO/NO₂ - Nitrous Oxides



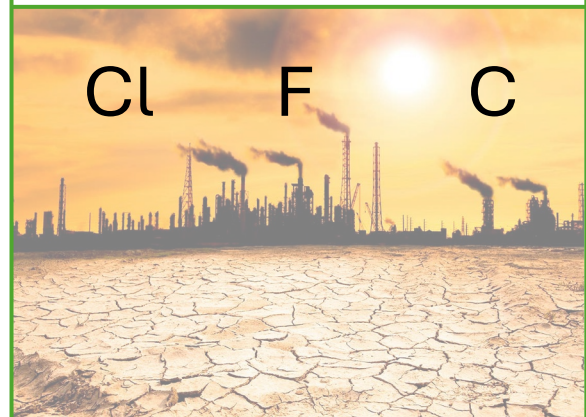
SO₂ - Sulphur Dioxide



CO₂ - Carbon Dioxide



CFC - Chloro Fluoro Carbons



CH₄ - Methane



Methane is a powerful greenhouse gas which has a warming effect 34 times greater than Carbon Dioxide (over a 100 year period). It is released from peatlands as well as living organisms, much coming from livestock like cows. An estimated **60%** of today's methane emissions are the result of human activities.

NH₃ - Ammonia



Ammonia (NH₃) is a gas that only stays in the atmosphere for a few hours. If it mixes with other gases, it forms particulate matter which remains in the air for much longer and has significant health concerns associated with air quality, especially in towns and cities,

NO/NO₂ - Nitrous Oxides



Nitrous Oxides come mostly from the use of fertilisers or manure in farming. Nitrogen Oxide (NO) is harmful because it harms the ozone layer which shields us from harmful radiation from space. It also produces Nitrogen Dioxide (NO₂) which traps heat in the atmosphere.

SO₂ - Sulphur Dioxide



Petrol, diesel, coal and other fuels contain Sulphur. When they are burned (e.g. used in a car), the Sulphur and Oxygen combine to form Sulphur Dioxide (SO₂). SO₂ can cause wheezing, shortness of breath or other health problems for humans.

CO₂ - Carbon Dioxide



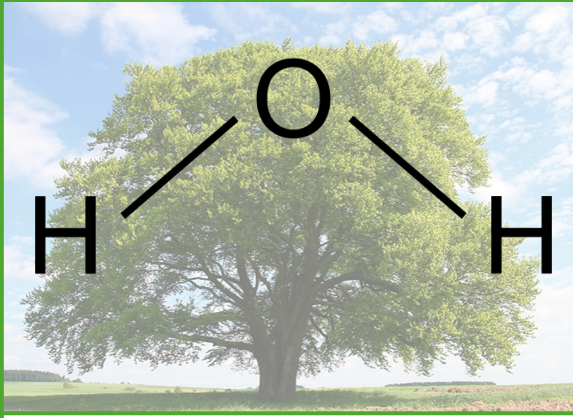
While Carbon Dioxide (CO₂) is a vital ingredient in photosynthesis for all plant-life, human activity has caused an increase in CO₂ in the atmosphere by over 50%. CO₂ traps heat in the atmosphere, leading to significant changes in our planet's climate.

CFC - Chloro Fluoro Carbons



ChloroFluoroCarbons (CFCs) are non-toxic, non-flammable chemicals. They used to be commonly used in fridges and aerosol cans but were found to cause significant damage to the ozone layer. They are no longer commonly used and the ozone layer has recovered.

H₂O - Water Vapour



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Aerosols

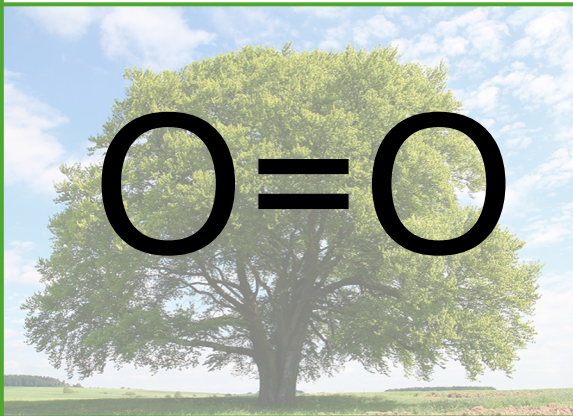


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O₂ - Oxygen

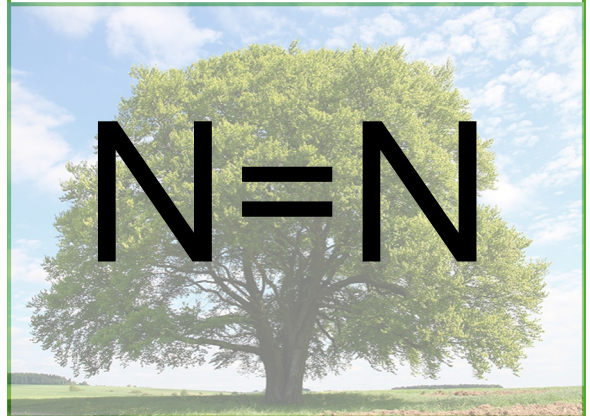


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N₂ - Nitrogen

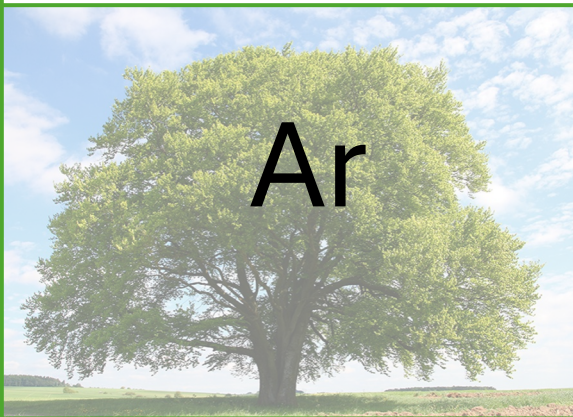


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Ar - Argon

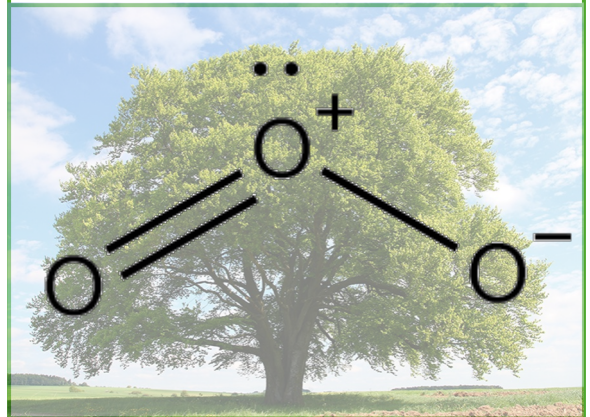


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O₃ - Ozone



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H₂O - Water Vapour

Water is constantly cycling through the atmosphere, due to evaporation and precipitation. Gaseous water (Water vapour) absorbs heat radiated from Earth's surface which prevents heat loss to space, instead the heat is radiated in all directions, including back down to the surface.

Aerosols

Aerosols are small particles like dust, spray, smoke and ash which have an important impact on the balance of heat trapped in the atmosphere and radiated to space. At ground level, breathing in aerosols can cause damage to airways and significant long term health problems.

O₂ - Oxygen

Oxygen is an essential component to many living creatures, including humans. The act of breathing involves exchanging Carbon Dioxide in the bloodstream - produced by respiration - with fresh Oxygen from the atmosphere. Humans are adapted to breathe the ~21% Oxygen in the atmosphere.

N₂ - Nitrogen

Despite not being the most important gas for living organisms, Nitrogen is the most abundant gas in the atmosphere, at over 70%. Nitrogen acts primarily as a dilutant, limiting the process of combustion (burning) so the entire atmosphere doesn't set on fire with any small reaction.

Ar - Argon

The Earth's atmosphere consists of about 1% Argon - a Noble gas with atomic weight of 40 (18 protons, 22 neutrons). Noble gases are highly non-reactive, so the Argon in the atmosphere is not part of a molecule. Argon forms mostly due to natural radioactive decay of Potassium-40 which is found in the Earth's crust and Mantle.

O₃ - Ozone

An Ozone molecule consists of three Oxygen atoms, as opposed to the Oxygen we breathe in O₂ form. Ozone can cause immediate breathing issues at high concentration at ground level, but the ozone layer, which sits 15-30km above Earth's surface, protects us from excess harmful space radiation.