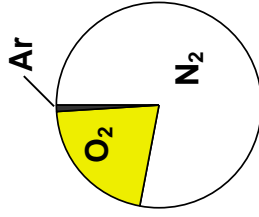


## THE EARTH'S ATMOSPHERE

### GASES FOUND IN 'CLEAN' AIR

Gas	Formula	% by volume
nitrogen	N <sub>2</sub>	78
oxygen	O <sub>2</sub>	21
argon	Ar	1
carbon dioxide	CO <sub>2</sub>	0.04
water	H <sub>2</sub> O	variable (0-4)



- the earth's atmosphere is about 15km thick
- it is like a very thin skin around our planet
- contains the right amount of chemical for life
- human activities add small amounts of some gases...  
**CARBON MONOXIDE, SULPHUR DIOXIDE, NITROGEN OXIDES**
- these are called **POLLUTANTS**...

SULPHUR DIOXIDE SO<sub>2</sub>

CARBON MONOXIDE CO

NITROGEN OXIDES NOx

PARTICULATES - very tiny bits of carbon

they are... directly harmful to the humans / environment

- CARBON MONOXIDE** is POISONOUS
- SULPHUR DIOXIDE** causes ACID RAIN which kills forests, pollutes lakes and erodes buildings
- OXIDES OF NITROGEN** cause SMOG and affect people with BREATHING PROBLEMS

**PARTICULATES** makes things DIRTY and also affect people with BREATHING PROBLEMS

## PRODUCING POLLUTANTS

- COAL** - is formed mainly of carbon
- FOSSIL FUELS** - coal, oil and natural gas
- HYDROCARBON** - compound made up of C and H atoms only
- COMBUSTION** - reaction when fuels burn in oxygen



- many fossil fuels **contain sulphur**
- when the fuel is burnt, the sulphur turns to sulphur dioxide



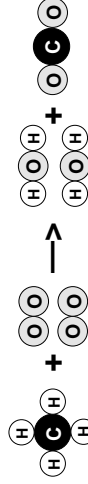
- most SO<sub>2</sub> is produced from power stations

## REMOVING POLLUTANTS

- PARTICULATES** - deposited on surfaces, making them DIRTY
- SULPHUR DIOXIDE** - reacts with water to make ACID RAIN
- NITROGEN OXIDES** - react with oxygen / water → ACID RAIN
- CARBON DIOXIDE** - dissolves in rain water and sea water - removed by PHOTOSYNTHESIS

## CHEMICAL REACTIONS

- atoms re-arrange during a chemical reaction
- the numbers of atoms of each element must be the same in the products as in the reactants;



- molecules can be represented by formulae and pictures

oxygen nitrogen

water carbon

sulphur dioxide carbon dioxide

carbon monoxide nitrogen dioxide

## REDUCING POLLUTION

- use less electricity
- remove sulphur from gas and fuel oil
- remove sulphur dioxide from waste gases
- burn less fossil fuel
- use low sulphur fuels
- use catalytic converters in cars  
nitrogen monoxide → nitrogen  
carbon monoxide → carbon dioxide
- encourage use of public transport

## USING DATA

You need to know what these mean

- MEAN**
- OUTLIER**
- RANGE**
- WHY REPEAT READINGS?**
- CAUSES OF DIFFERENT RESULTS**
- DEPENDENT VARIABLE**
- INDEPENDENT VARIABLE**
- CONTINUOUS VARIABLE**
- CATEGORIC VARIABLE**
- ORDERED VARIABLE**
- CORRELATION**