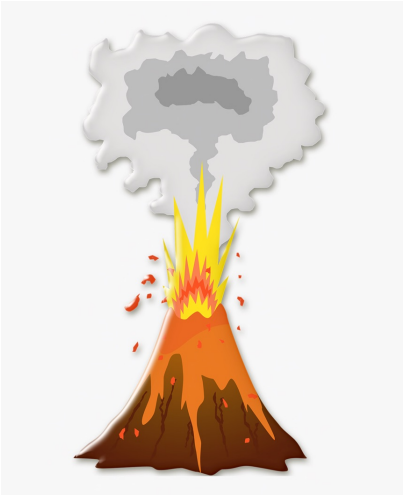
Evolution of the atmosphere:

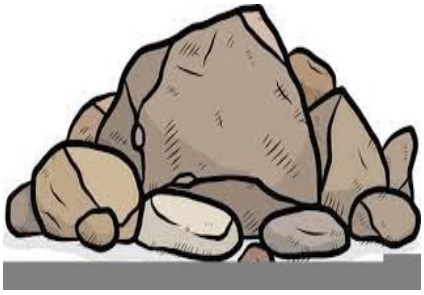


1. Volcanoes emitted Nitrogen, Water & Ammonia
CO2 was abundant (similar to Mars & Venus today)

2. H2O vapour condensed = oceans
CO2 dissolved in oceans (carbonate precipitates reacted to form sediment on the sea bed)
Green plants & algae absorbed CO2 via photosynthesis + marine animals' shells contained carbonates from oceans

Sedimentary rock formation:

Dead plankton on the seabed is compressed & forms sedimentary rocks, as deposits get trapped in rocks (trapping CO2 too)
Extraction & combustion of plankton = fossil fuels
Coal is made from plant deposits
Limestone is made from calcium carbonate deposits from skeletons



3. Plants & algae (which evolved 2.7mil years before plants) produced O2 via photosynthesis so animals evolved
200 million years ago atmosphere reached:
80% nitrogen
20% oxygen
& minuscule amounts of: O2 & H2O

Greenhouse gases & Climate change:

Greenhouse gases: CH4, CO2 & H20
Fossil fuels: Coal, Crude oil, Natural gas

Enhanced greenhouse effect:

Sun emits short wave length radiation to Earth, it absorbs some & reflects some heat (as long wave radiation) back to space
BUT
Greenhouse gases act as insulating layer so trap heat in the earth's atmosphere = temperatures rise

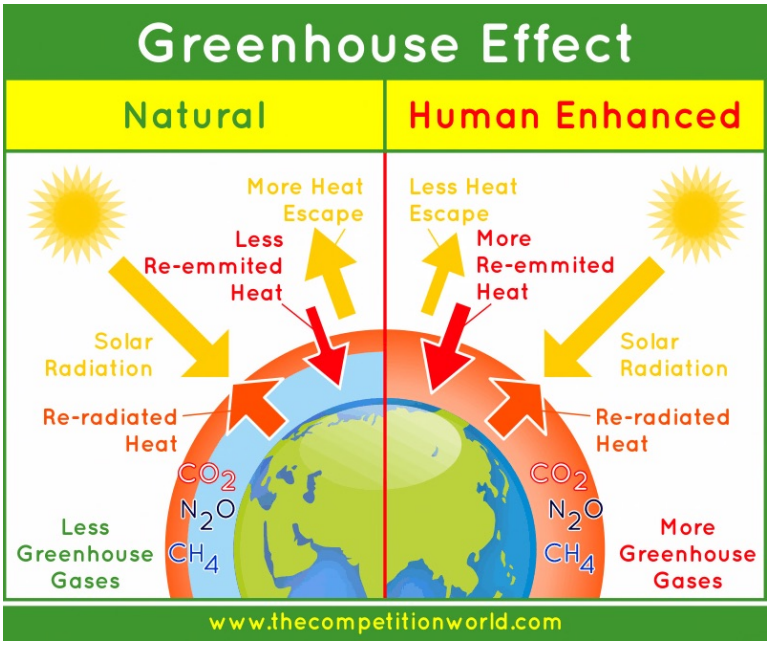
Activities that increase emissions:
Deforestation: no CO2 sinks
Fossil fuel combustion: emitters greenhouse gases
Agriculture: CH4 produced via cows' digestive system & flooding rice paddies = CH4
Waste: landfill releases CH4 via decomposition

Greenhouse effect = vital to support life on earth by keeping temp high enough

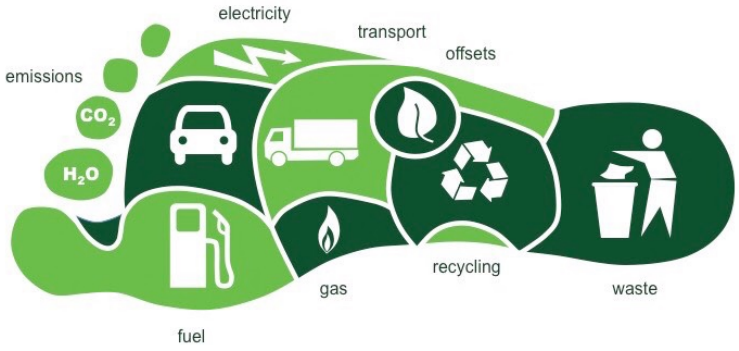
But increase in CO2 & CH4 in atmosphere = temps rise = global warming = climate change (peer-reviewed evidence supports human blame for a warming climate but earth is COMPLEX)

Consequences of climate change:

Ice caps melt via thermal expansion = rise in sea levels, coastal erosion & flooding
Pressure changes = rainfall pattern changes = severe & intense storms
Higher temps = droughts = crop shortages = starvation = death



Carbon footprints:



Measure of CO2 emitted by products/people/companies during their lifespan
Complex to calculate as have to consider WHOLE product life cycle

Reduction of CO2 footprints:

Renewable energy
Efficient appliances 2 conserve energy
Tax businesses with high emissions, remove fossil fuel subsides
Greenhouse gas emission caps
Carbon capture (store CO2 in oil wells underground)

Reduction is hard:

Costly to research alternative tech
Detrimental to economic development (hard to make international agreements)
Lifestyle changes are costly & uncomfortable

Air pollution:

Fossil fuels contain hydrocarbons (carbon & hydrogen are oxidised during combustion = CO2 + H20 emitted)
Complete combustion = plenty of O2
Incomplete combustion = lack O2 so particulates of soot are emitted = respiratory issues & particulates reflect short-wave length radiation back to space = global dimming

CO (carbon monoxide) is also emitted: red blood cells have higher affinity for CO so it binds to haemoglobin = less O2 reaches body cells & heart = heart attack (undetectable as no colour/scent - 'silent killer')
Can happen if car engine is running whilst car is stationary as no O2 is combining with fuel

Sulphur dioxide released during combustion as sulphur is oxidised
Nitrogen oxides released as nitrogen is oxidised (in hot car engines)
H20 + nitrogen/sulphur oxides -> dilute acids = acid rain (erodes soil & disturbs ecosystems)