

The composition and evolution of the Earth's atmosphere				
1	Approximate proportions of gases in the atmosphere	Nitrogen	79%	
		Oxygen	21%	
		Carbon dioxide	0.04%	
		Other gases	Include variable quantities water vapour and noble gases	
2	The early atmosphere	gases in the atmosphere 4.6 million years ago		
3	Theories about the early atmosphere	like the atmosphere of mars, mainly carbon dioxide, little or no oxygen		
4	The first billion years	volcanic activity released water vapour and nitrogen		
5	Formation of the oceans	water vapour from the atmosphere condensed		
6	Reducing carbon dioxide	carbon dioxide dissolved in the oceans and carbonates were precipitated		
7	Green plants	absorb carbon dioxide and release oxygen during photosynthesis		
8	Photosynthesis	Carbon dioxide + Water → Oxygen + Glucose $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow 6\text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6$		
9	Algae	first plants that existed 2.7 billion years ago		
10	"Locking up" carbon	formation of sedimentary rocks and fossil fuels containing carbon caused further decrease of CO <sub>2</sub>		
11	Fossil fuels	over millions of years plankton and plant deposits are compressed. e.g. coal, oil, natural gas		
Carbon dioxide and methane as greenhouse gases				
12	Greenhouse gases	An insulating layer of gases that maintain Earth's temperatures at a level to support life		
13	e.g. greenhouse gases	carbon dioxide, methane and water vapour		
14	Greenhouse effect	1. greenhouse gases don't absorb incoming short wavelength radiation from the sun		
		2. long wavelength radiation that is reflected back from the Earth is reradiated in all directions		
		3. longwave radiation is thermal radiation, so warms the surface of the Earth		
15	Climate change	Earth's temperature is increasing due to rising CO <sub>2</sub> levels		
16	Human activities that increase CO <sub>2</sub>	deforestation, burning fossil fuels, decomposition of waste in landfills		
17	Human activities that increase CH <sub>4</sub>	agriculture: animal digestion, rice farming. decomposition of waste		
18	Effects of climate change	melting polar ice caps, changes in rainfall patterns, more frequent storms, temperature increase		
The carbon footprint and its reduction				
19	Carbon footprint	total amount of carbon dioxide and other greenhouse gases emitted during the lifetime of a product		
20	Reducing the carbon footprint	government tax on greenhouse gas emissions, government sell industry licences, carbon capture technology, reduce use of non-renewable fuels		
21	Difficulties reducing carbon footprint	impacts on economic growth, changes to lifestyles needed, lack of education		
Common atmospheric pollutants and their sources				
22	Atmospheric pollutants	harmful particles and gases released into the atmosphere		
23	Examples of atmospheric pollutants	carbon dioxide (CO <sub>2</sub> ), water vapour (H <sub>2</sub> O <sub>(g)</sub> ), carbon monoxide (CO), sulfur dioxide (SO <sub>2</sub> ), oxides of nitrogen, particulates		
24	Sources and effects of atmospheric pollutants	Pollutant	Source	Effect
		CO <sub>2</sub> , H <sub>2</sub> O <sub>(g)</sub>	Combustion of fossil fuels	Greenhouse effect
		CO	Incomplete combustion	Fainting, coma, death
		SO <sub>2</sub>	Combustion of coal (SO <sub>2</sub> mixes with clouds, producing sulfuric acid)	Acid rain (kills plants, corrodes buildings and metal)
		Nitrogen oxides	Internal combustion engines	Acid rain
particulates	Soot from combustion	Respiratory problems, global dimming		
25	Incomplete combustion	Not enough oxygen present for complete combustion		

