

Core questions – Chemistry – Unit 9 – Chemistry of the atmosphere

No.	Question	Answer
1	What gases are present in today's atmosphere on Earth?	Nitrogen, oxygen, carbon dioxide, water vapour
2	What are the proportions of the gases in the current atmosphere on Earth?	About 80% nitrogen About 20% oxygen Small amounts of carbon dioxide, water vapour and noble gases
3	How long have the proportions of different gases in the atmosphere been the same?	200 million years
4	Why is the evidence about the Earth's early atmosphere limited?	The time scale of 4.6 billion years
5	How the Earth's early atmosphere was formed?	Intense volcanic activity that released gases
6	How were the oceans formed?	Water vapour that condensed
7	What was the main gas in the early atmosphere?	Carbon dioxide
8	What other gases were present in the early atmosphere?	Small amount of methane and ammonia
9	What was the Earth's early atmosphere compared to?	Atmospheres of Mars and Venus today - mainly carbon dioxide with little or no oxygen gas
10	How did the amount of nitrogen in the atmosphere increase?	Volcanoes produced nitrogen
11	Where did the oxygen in the atmosphere come from?	Photosynthesis of algae and plants
12	How long ago did algae evolve?	2.7 billion years ago
13	Why did the amount of carbon dioxide in the atmosphere decrease?	<ul style="list-style-type: none"> • Photosynthesis • Locked up in carbonate rocks (limestone) • Locked up in fossil fuels (oil, coal, gas) • Dissolved into the oceans
14	What are the greenhouse gases?	Water vapour, carbon dioxide, methane
15	What is the greenhouse effect?	Short wavelength radiation (light) passes through the atmosphere Long wave radiation (thermal) is reflected back, but gets trapped by greenhouse gases
16	Why are greenhouse gases important?	The maintain temperatures on Earth high enough to support life
17	What have humans done to increase the amount of carbon dioxide in the atmosphere?	Deforestation Burning fossil fuels
18	What have humans done to increase the amount of methane in the atmosphere?	Agriculture – farm animals release methane Landfill sites release methane and carbon dioxide
19	How are human activities affecting the temperature of the Earth's atmosphere?	It is increasing, which increases the surface temperature
20	What does an increase in the surface temperature of the Earth cause?	Climate change
21	Why do scientists believe that climate change is happening?	It is based on peer reviewed evidence

22	Why is it hard to fully understand the Earth's climate?	It is complex, and there are many variables, meaning it's difficult to make models that aren't over simplified
23	What are the consequences of climate change?	<ul style="list-style-type: none"> • Polar ice caps melting • Changes in rainfall patterns • More extreme weather events • Differences in the distributions of wildlife
24	What is the consequence of the polar ice caps melting?	It will cause a rise in sea levels, increased flooding and coastal erosion
25	What is the consequence of changes in rainfall patterns?	Some regions may get too much of too little water making it more difficult to make food
26	What is a carbon footprint?	The total amount of carbon dioxide and other greenhouse gases emitted over the full life cycle of a product, service or event
27	What can be done to reduce the carbon footprint?	<ul style="list-style-type: none"> • Use renewable energy sources instead of fossil fuels • Avoid putting waste into landfill sites • Tax products, services or events that produce large amount of carbon dioxide • Use carbon capture and storage in power stations
28	Why is making reductions in the carbon footprint difficult?	<ul style="list-style-type: none"> • Lots more research needs to be done with renewable fuels • Governments are worried making changes will affect the economic growth of communities • Individuals don't want to make changes to their lifestyles
29	What is a fossil fuel?	A substance that contains a mixture of hydrocarbons
30	What are the products when fossil fuels are burnt?	Carbon dioxide, water vapour, carbon monoxide, sulfur dioxide, oxides of nitrogen, particulates
31	What is the equation for complete combustion?	fuel + oxygen → carbon dioxide + water
32	What is the equation for incomplete combustion?	fuel + oxygen → carbon dioxide + carbon monoxide + water + carbon
33	What is carbon monoxide?	Carbon monoxide is a toxic gas. It is colourless and odourless
34	What are the consequences of sulfur dioxide and nitrous oxides being released into the atmosphere?	They can cause respiratory problems if breathed in and acid rain when mixed with clouds
35	What are particulates?	Solid particles of soot (carbon)
36	What health problems are associated with particulates?	If they are inhaled, they can cause respiratory problems
37	What environmental problems are associated with particulates?	They can reflect sunlight back into space, causing global dimming