

AQA (GCSE Notes)

Chapter 9: Chemistry of the Atmosphere

- Q1.** What are the main gases in the Earth's atmosphere today and their approximate percentages?
- Q2.** Name three other gases found in small amounts in the atmosphere besides nitrogen and oxygen.
- Q3.** For approximately how long have the proportions of gases in the atmosphere remained fairly constant?
- Q4.** Which gas makes up about 80% of the Earth's atmosphere?
- Q5.** Which gas makes up about 20% of the Earth's atmosphere?
- Q6.** What role do noble gases play in the atmosphere?
- Q7.** How can percentages be used to describe the composition of the atmosphere?
- Q8.** How would you express the proportion of nitrogen in the atmosphere as a fraction?
- Q9.** How would you express the proportion of oxygen in the atmosphere as a ratio?
- Q10.** Which gas was the most abundant in the early Earth's atmosphere?
- Q11.** What caused the release of gases that formed the early atmosphere?
- Q12.** What is believed to have released water vapour into the early atmosphere?
- Q13.** What happened to the water vapour once the Earth cooled?
- Q14.** How did the formation of oceans affect the amount of carbon dioxide in the atmosphere?
- Q15.** What type of compounds were formed when carbon dioxide dissolved in the oceans?
- Q16.** How were sediments formed in the early oceans?
- Q17.** Which gas increased in the atmosphere due to volcanic activity?
- Q18.** Name two gases, other than carbon dioxide and nitrogen, thought to be in the early atmosphere.
- Q19.** Why is it difficult to be certain about the composition of the early atmosphere?
- Q20.** How long ago did scientists believe the Earth formed?
- Q21.** What do the atmospheres of Mars and Venus consist mainly of?
- Q22.** Why is the early Earth's atmosphere compared to Mars and Venus?

- Q23.** What is one reason the amount of carbon dioxide in the atmosphere decreased?
- Q24.** Why might there have been no oxygen in the early atmosphere?
- Q25.** What evidence do scientists use to develop theories about the early atmosphere?
- Q26.** How do sediments provide evidence for early atmospheric changes?
- Q27.** How did volcanic eruptions help form the early atmosphere?
- Q28.** What process removed carbon dioxide from the early atmosphere?
- Q29.** Why do scientists use models to understand the Earth's early atmosphere?
- Q30.** What challenges do scientists face when studying the Earth's early atmosphere?
- Q31.** Explain how water vapour could have contributed to the formation of oceans.
- Q32.** Why might ammonia and methane have been present in the early atmosphere?
- Q33.** What happens when carbon dioxide dissolves in water?
- Q34.** What evidence supports the idea that the early atmosphere was mainly carbon dioxide?
- Q35.** How do volcanic gases today help us understand the early atmosphere?
- Q36.** Why is nitrogen believed to have built up in the early atmosphere?
- Q37.** Why do scientists believe the early Earth had a lot of volcanic activity?
- Q38.** How might ammonia and methane have affected the early Earth?
- Q39.** What is the importance of evaluating different theories about the early atmosphere?
- Q40.** What is a possible reason for limited evidence about the Earth's early atmosphere?
- Q41.** How might the presence of carbonates in sedimentary rocks be used as evidence?
- Q42.** How could you describe the change in atmospheric gases over time?
- Q43.** What caused the first major changes in atmospheric gas composition?
- Q44.** How might studying other planets help us understand the Earth's past?
- Q45.** Why is there more certainty about the current atmosphere than the early one?
- Q46.** What role did oceans play in shaping the atmosphere?
- Q47.** What process allowed nitrogen to become a major part of the atmosphere?

- Q48.** How do ratios help us describe atmospheric gases?
- Q49.** What could be the result if volcanic activity had not released gases?
- Q50.** How has the composition of the atmosphere helped support life on Earth?
- Q51.** How did algae contribute to the increase of oxygen in the Earth's atmosphere?
- Q52.** Why did the percentage of oxygen in the atmosphere increase after plants evolved?
- Q53.** What process do algae and plants use to produce oxygen?
- Q54.** What is the balanced word equation for photosynthesis?
- Q55.** Why is the appearance of oxygen in the atmosphere around 2.7 billion years ago considered important for life?
- Q56.** What role did photosynthesis play in changing the composition of Earth's early atmosphere?
- Q57.** How does the activity of aquatic plants in daylight demonstrate the production of oxygen?
- Q58.** Why could animals only evolve after the oxygen level in the atmosphere increased?
- Q59.** How did carbon dioxide levels decrease due to the actions of algae and plants?
- Q60.** How does the formation of sedimentary rocks reduce carbon dioxide in the atmosphere?
- Q61.** What type of carbon-containing rocks formed from marine organisms' shells?
- Q62.** How does the formation of fossil fuels contribute to the reduction of carbon dioxide?
- Q63.** Describe the process through which coal is formed from dead plant material.
- Q64.** Explain how crude oil and natural gas are formed over millions of years.
- Q65.** What conditions are required for the formation of fossil fuels from dead organisms?
- Q66.** Why is limestone considered a carbon store?
- Q67.** Describe one geological process that helps reduce carbon dioxide in the atmosphere.
- Q68.** Why do carbon stores such as fossil fuels represent long-term removal of carbon from the atmosphere?
- Q69.** What impact did early photosynthetic organisms have on Earth's climate?
- Q70.** Describe how the carbon cycle is linked to atmospheric changes.
- Q71.** What is meant by a greenhouse gas?

- Q72.** How does water vapour contribute to the greenhouse effect?
- Q73.** Why are carbon dioxide and methane considered greenhouse gases?
- Q74.** What happens to short wavelength radiation from the Sun when it reaches Earth?
- Q75.** What happens to the energy emitted by Earth as long wavelength radiation?
- Q76.** How do greenhouse gases trap energy in the Earth's atmosphere?
- Q77.** Describe how the greenhouse effect keeps Earth warm enough to support life.
- Q78.** Why is the greenhouse effect important for maintaining life on Earth?
- Q79.** What could happen if greenhouse gas levels increase significantly?
- Q80.** How does deforestation affect the level of carbon dioxide in the atmosphere?
- Q81.** How can human activities contribute to rising methane levels?
- Q82.** What is the role of agriculture in the production of greenhouse gases?
- Q83.** How does burning fossil fuels affect the composition of the atmosphere?
- Q84.** Why is it difficult to reverse the effects of increased greenhouse gas emissions?
- Q85.** Explain the link between fossil fuel usage and climate change.
- Q86.** What natural processes help remove carbon dioxide from the atmosphere?
- Q87.** How might volcanic activity have influenced early atmospheric conditions?
- Q88.** Why did Earth's early atmosphere have a high concentration of carbon dioxide?
- Q89.** Describe how carbon is cycled through living organisms and the atmosphere.
- Q90.** What evidence suggests that oxygen appeared in the atmosphere about 2.7 billion years ago?
- Q91.** What would happen to Earth's temperature without greenhouse gases?
- Q92.** Why are greenhouse gases compared to a blanket around the Earth?
- Q93.** Describe how the greenhouse effect involves energy transfer between the Sun, Earth, and the atmosphere.
- Q94.** Why does methane have a stronger greenhouse effect than carbon dioxide?
- Q95.** How do oceans help regulate the level of carbon dioxide in the atmosphere?
- Q96.** How is carbon dioxide involved in the formation of limestone?

- Q97.** What role do marine organisms play in carbon dioxide removal?
- Q98.** Why does photosynthesis reduce the greenhouse effect?
- Q99.** How might future changes in fossil fuel usage affect global temperatures?
- Q100.** What are two ways that humans can reduce the release of greenhouse gases?
- Q101.** What is the name of the process by which human activities are increasing the Earth's surface temperature?
- Q102.** Name two human activities that increase the amount of carbon dioxide in the atmosphere.
- Q103.** Name two human activities that increase the amount of methane in the atmosphere.
- Q104.** Explain how deforestation can lead to an increase in atmospheric carbon dioxide.
- Q105.** How does burning fossil fuels contribute to the greenhouse effect?
- Q106.** Describe how farming cattle increases methane levels in the atmosphere.
- Q107.** How does the decay of organic matter in landfill sites increase methane emissions?
- Q108.** Why is it difficult to create accurate models for predicting climate change?
- Q109.** What is meant by a simplified model in climate science?
- Q110.** Why can simplified climate models lead to misinformation in the media?
- Q111.** What is the role of peer review in climate science?
- Q112.** Why is it important for scientists to share their climate findings with a wide audience?
- Q113.** What are the benefits of using peer-reviewed sources when studying climate change?
- Q114.** Explain how uncertainty in evidence can affect conclusions about climate change.
- Q115.** How can bias in media reports affect public understanding of climate change?
- Q116.** What is meant by the term "global climate change"?
- Q117.** What is the link between increased global temperatures and sea level rise?
- Q118.** How can climate change affect weather patterns?
- Q119.** Give one way that climate change might affect biodiversity.
- Q120.** Describe how changes in rainfall patterns due to climate change can affect agriculture.
- Q121.** Why are small island nations particularly at risk from global climate change?

Q122. What is the difference between climate change and weather?

Q123. How can climate change affect human health?

Q124. Why is it important to consider long-term data when studying climate change?

Q125. Give an example of a risk linked to global climate change.

Q126. Why might some people be more vulnerable to the effects of climate change?

Q127. Describe how climate change could affect global food production.

Q128. How could changes in temperature affect the spread of diseases?

Q129. Why do scientists study ice cores to learn about past climates?

Q130. What role do oceans play in regulating the Earth's climate?

Q131. How does an increase in greenhouse gases lead to climate change?

Q132. Explain the greenhouse effect in terms of radiation from the sun and the Earth.

Q133. Why is carbon dioxide called a greenhouse gas?

Q134. Why is methane more powerful as a greenhouse gas than carbon dioxide?

Q135. What human activity is the biggest source of carbon dioxide emissions?

Q136. Describe one way to reduce methane emissions from landfill sites.

Q137. Why is it important to reduce greenhouse gas emissions?

Q138. Explain how rising global temperatures could affect natural ecosystems.

Q139. What is one potential economic impact of global climate change?

Q140. Why is international cooperation important in tackling climate change?

Q141. How can individuals reduce their carbon footprint?

Q142. What is meant by the term "carbon footprint"?

Q143. Explain how renewable energy can help reduce greenhouse gas emissions.

Q144. Describe one limitation of using biofuels to reduce carbon dioxide levels.

Q145. Why is reducing car use an effective way to lower CO₂ emissions?

Q146. How does climate change threaten polar habitats?

- Q147.** What is a potential social consequence of rising sea levels?
- Q148.** Describe one way that climate change might affect migration patterns.
- Q149.** Why do some scientists disagree on how quickly climate change will happen?
- Q150.** How can governments encourage people to reduce greenhouse gas emissions?
- Q151.** What is meant by the term 'carbon footprint'?
- Q152.** Name two greenhouse gases that contribute to a product's carbon footprint.
- Q153.** Give two actions that can be taken to reduce carbon dioxide emissions.
- Q154.** How can individuals reduce their personal carbon footprint?
- Q155.** Suggest a reason why switching to renewable energy reduces carbon dioxide emissions.
- Q156.** Explain why reducing methane emissions from agriculture might be difficult.
- Q157.** Why might governments find it hard to reduce carbon emissions quickly?
- Q158.** Describe how improving home insulation can help reduce greenhouse gas emissions.
- Q159.** Give one reason why reducing the use of fossil fuels can be challenging for some countries.
- Q160.** How does reducing food waste help lower methane emissions?
- Q161.** What are the main elements found in most fossil fuels?
- Q162.** Name four gases that may be released when a fuel is burned.
- Q163.** What is the role of sulfur in the production of sulfur dioxide when fuels are burned?
- Q164.** What is formed when carbon in a fuel burns completely?
- Q165.** What are the main conditions needed to produce carbon monoxide during combustion?
- Q166.** What solid particles are formed from incomplete combustion of fuels?
- Q167.** How are oxides of nitrogen formed during combustion in car engines?
- Q168.** What is a common source of unburned hydrocarbons in the air?
- Q169.** Why is water vapour not considered a harmful pollutant from combustion?
- Q170.** How can you predict the products of combustion of a fuel if you know its composition?
- Q171.** What makes carbon monoxide especially dangerous to humans?

- Q172.** Why is carbon monoxide hard to detect without special equipment?
- Q173.** What happens to the body when carbon monoxide is inhaled?
- Q174.** Name one human health issue caused by inhaling soot or particulates.
- Q175.** What is global dimming and how is it linked to particulates?
- Q176.** How do sulfur dioxide and nitrogen oxides cause acid rain?
- Q177.** Give one effect of acid rain on buildings.
- Q178.** What impact does acid rain have on aquatic life?
- Q179.** How do oxides of nitrogen cause breathing difficulties?
- Q180.** Describe one way that sulfur dioxide affects human health.
- Q181.** How can industry reduce the amount of sulfur dioxide released into the air?
- Q182.** What device in cars helps reduce the emission of nitrogen oxides?
- Q183.** How does the use of catalytic converters reduce air pollution from vehicles?
- Q184.** Why is it better to burn natural gas than coal in terms of pollution?
- Q185.** Why are particulates harmful to people with asthma?
- Q186.** Give one environmental impact of increased levels of particulates.
- Q187.** How can air pollution be reduced in cities?
- Q188.** Why do governments monitor air quality near busy roads?
- Q189.** Explain how burning fossil fuels contributes to poor air quality.
- Q190.** How do emissions from vehicles affect the environment?
- Q191.** What might be the long-term health effects of living in an area with high air pollution?
- Q192.** Why is it important to reduce emissions from power stations?
- Q193.** Give one reason why people oppose stricter pollution controls on factories.
- Q194.** What is meant by the term 'unburned hydrocarbons'?
- Q195.** How can improving fuel efficiency help reduce pollution?
- Q196.** Why is complete combustion preferred over incomplete combustion?

Q197. What is one problem caused by carbon monoxide inside homes?

Q198. Describe the link between air pollution and climate change.

Q199. Why are diesel engines sometimes more polluting than petrol engines?

Q200. How do indoor pollutants differ from outdoor pollutants in terms of health risks?

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