

Subject	Year 9Chemistry Threshold Concepts – Summer Term	How to support students' learning
Chemistry of the atmosphere	The proportions of different gases in the atmosphere - Recall the proportions of different gases in the atmosphere The Earth's early atmosphere - Interpret evidence and evaluate different theories about the Earth's early atmosphere How oxygen increased - Describe the processes that lead to an increase in oxygen in the atmosphere How carbon dioxide decreased - Describe the main changes in the atmosphere over time and some of the likely causes of these changes - Describe and explain the formation of deposits of limestone, coal, crude oil and natural gas	- Encourage your child to watch this video on how Earth's atmosphere has changed over time GCSE Chemistry - Evolution of the Atmosphere #67 - YouTube - Encourage your child to visit the Centre for Science education website to read about the gases in the atmosphere and atmospheric pollution What's In the Air? Center for Science Education (ucar.edu)

	Greenhouse gases • Describe the greenhouse effect in terms of the interaction of short and long wavelength radiation with matter Human activities which contribute to an increase in greenhouse gases in the atmosphere • Recall two human activities that increase the amounts of each of the greenhouse gases carbon dioxide and methane • Evaluate the quality of evidence in a report about global climate change given appropriate information • Describe uncertainties in the evidence base • Recognise the importance of peer review of results and of communicating results to a wide range of audiences Global climate change • Describe briefly four potential effects of global climate change • Discuss the scale, risk and environmental implications of global climate change The carbon footprint and its reduction	• Encourage your child to visit BBC bitesize to learn about combustion and burning fuels What is combustion? - BBC Bitesize
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Rates of reaction	• Describe actions to reduce emissions of carbon dioxide and methane • Give reasons why actions may be limited Atmospheric pollutants from fuels • Describe how carbon monoxide, soot (carbon particles), sulfur dioxide and oxides of nitrogen are produced by burning fuels • Predict the products of combustion of a fuel given appropriate information about the composition of the fuel and the conditions in which it is used Properties and effects of atmospheric pollutants • Describe and explain the problems caused by increased amounts of these pollutants in the air Calculating rates of reaction • Calculate the mean rate of reaction from given information about the quantity of a reactant used or the quantity of a product formed and the time taken • Draw, and interpret graphs showing the quantity of product formed or quantity of reactant used up against time	• Encourage your child to watch this video on air pollution Air Pollution Video for Kids Causes, Effects & Solution - YouTube • Encourage your child to watch this video on how to calculate the rate of a reaction using a graph GCSE Chemistry - How to Calculate the Rate of Reaction - Measuring Rate of Reaction #48 - YouTube
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	• Draw tangents to the curves of these graphs and use the slope of the tangent as a measure of the rate of reaction •HT ONLY Calculate the gradient of a tangent to the curve on these graphs as a measure of rate of reaction at a specific time Factors which affect the rates of chemical reactions • Recall how changing these factors affects the rate of chemical reactions. Collision theory and activation energy • Predict and explain using collision theory the effects of changing conditions of concentration, pressure and temperature on the rate of a reaction • Predict and explain the effects of changes in the size of pieces of a reacting solid in terms of surface area to volume ratio • Use simple ideas about proportionality when using collision theory to explain the effect of a factor on the rate of a reaction. Catalysts • Identify catalysts in reactions from their effect on the rate of reaction and because they are not included in the chemical equation for the	• Encourage your child to visit BBC bitesize to learn about the factors that can affect the rate of a chemical reaction Rate of reaction - Rates of reaction - AQA - GCSE Combined Science Revision - AQA Trilogy - BBC Bitesize • Encourage your child to read about a catalyst and what a catalyst can do to a reaction Catalysts - Rates of reaction - AQA - GCSE Combined Science Revision - AQA Trilogy - BBC Bitesize
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	reaction. •Explain catalytic action in terms of activation energy.	
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