Science: AF1 Models

	Foundation (1-3)	Developing (4-5)	Secure (6-7)	Excellence (8-9)
End of Year 7	• Spot what a very simple model is showing. • Draw and label simple models with support.	• Draw and label simple models. Use simple models to describe scientific ideas.	• Describe and explain scientific ideas using a model.	• Identify the strengths and weaknesses of particular models at representing things/explaining things in the real world.
End of Year 8	• Spot what a very simple model is supposed to be showing for different areas of science. • Draw and label simple models without support.	• Use simple models to describe scientific ideas.	• Explain scientific ideas using a model or identify the strengths and weaknesses of particular models. • Be able to apply models from different areas of science to clarify/explain observations and findings.	• Make links between models from different areas of science and what happens in real life. • Consistent use of important keywords in explanations
End of Year 9	• Spot what various more complicated models are supposed to be showing. • Use simple models to describe scientific ideas using appropriate terminology.	• Explain scientific ideas using a model. • Make links between models and what happens in real life.	• Be able to apply models from different areas of science to clarify observations and findings. • Consistent use of important keywords in scientific explanations	• Describe or explain processes or phenomena, logically and in detail, making use of abstract ideas and models from different areas of science.

AF2: Applications of Science

	Foundation (1-3)	Developing (4-5)	Secure (6-7)	Excellence (8-9)
End of Year 7	• Recognise applications of specific scientific ideas. State simply how they work.	• Describe some simple positive and negative consequences of scientific and technological developments.	• Explain how the technology works using scientific terminology.	• Indicate how scientific or technological developments may affect different groups of people in different ways.
End of Year 8	• Describe some simple positive and negative consequences of scientific and technological developments.	• Explain how the technology works using scientific terminology.	• Indicate how scientific or technological developments may affect different groups of people in different ways.	• Explain how societies are affected by particular scientific applications or ideas. • Suggest and explain economic, ethical/moral, social or cultural arguments for and against scientific or technological developments.
End of Year 9	• Explain how the technology works using scientific terminology with help/support.	• Indicate how scientific or technological developments may affect different groups of people in different ways.	• Explain how societies are affected by particular scientific applications or ideas. • Suggest and explain economic, ethical/moral, social or cultural arguments for and against scientific or technological developments. •	• Analyse ways in which scientific and technological developments may be influenced and suggest economic, ethical/moral, social or cultural arguments for and against scientific or technological developments.

Science: AF3 Presenting Recording Data				
	Foundation (1-3)	**Developing (4-5)**	**Secure (6-7)**	**Excellence (8-9)**
End of Year 7	• Write down a suitable set of data generated from a simple experiment e.g. by filling in a pre-prepared table of results.	• Make a series of measurements systematically. <u>Design</u> a simple results table and record your evidence clearly.	• Choose suitable ways (with support) of presenting simple experimental data using basic graphs e.g. bar charts and line graphs.	• Graphical display meets all criteria. Correct axis, correct scale, correct axis labels, accurate plotting of points and suitable line of best fit.
End of Year 8	• Make a series of measurements systematically. • Design a simple results table and record evidence clearly.	• Choose suitable ways (with support) of presenting simple experimental data using basic graphs e.g. bar charts and line graphs.	• Graphical display meets all criteria. • Correct axis, correct scale, correct axis labels, accurate plotting of points and suitable line of best fit.	• Decide on the best way to present scientific data using a range of graphs while following some scientific and mathematical rules when doing so e.g. calculating an average. • Almost faultless graphical display of data.
Year 9	• Plot a simple chart or graph to display data with support e.g. given pre-made axis.	• Graphical display meets all criteria correct axis, correct scale, correct axis labels, accurate plotting of points and suitable line of best fit.	• Decide on the best way to present scientific data using a range of graphs while following some scientific and mathematical rules when doing so e.g. calculating an average. • Almost faultless graphical display of data.	• Justify ways of presenting various data sets with particular graphs i.e. why is one type of graph better than another e.g. idea of categoric and continuous variables.

Science: AF4

	Foundation (1-3)	Developing (4-5)	Secure (6-7)	Excellence (8-9)
End of Year 7	• With support, list/choose equipment or information to plan a simple investigation. • Name one control variable in an investigation. • List risks/safety rules related to the work being carried out.	• List some variables to keep the same in order to achieve a fair test. • Select the most appropriate equipment to carry out the investigation. • Describe in simple terms how to investigate a given scientific question (write step-by-step instructions). • Identify/list risks/safety rules related to you, others and to the work being carried out.	• Identify one or more variables that could be investigated and choose one to investigate. • Select the most appropriate equipment to carry out your investigation and explain why you are using them. • Select a suitable range and intervals to use. • Make suggestions for safety rules related to you, others and the work you are carrying out and act on them.	• Identify all possible variables. Select and identify the independent and the dependent variable. • Choose and describe the method which will produce valid results. • Explain why you have chosen x number of repeats/ observations. • Choose an appropriate range, numbers and values for measurements/observations. • On your own identify the risks involved in your investigations and write safety rules to follow.
End of Year 8	• List some variables to keep the same in order to achieve a fair test. • Select appropriate equipment to carry out your investigation. • Describe in simple terms how to investigate a given scientific question. • Identify/list risks/safety rules related to you, others and to the work being carried out.	• List some variables to keep the same in order to achieve a fair test. Identify one or more variables that could be investigated and choose one to investigate. • Select the most appropriate equipment to carry out the investigation and explain why these are being used. • Describe how to investigate a given scientific question (write step-by-step instructions). • Make suggestions for safety rules related to you, others and to the work being carried out and act on them.	• Identify most relevant control variables Select and identify the Independent and the dependent variable. • Choose and describe method which will produce valid results. • Explain why you have chosen x number of repeats/observations. • Choose an appropriate range, numbers and values for measurements/observations. • On your own identify the risks involved in your investigations and write safety rules to follow.	• Write your own question to investigate Identify all possible variables, explain why some are difficult to control and how you will attempt to control them. • Select and identify the independent variable. • Select and identify the dependent variable. • Explain what you should do, if you identify outliers during an investigation. • On your own identify the risks involved in your investigations and write safety rules to follow; use hazcards to help you write them.
Year 9	• List some variables to keep the same in order to achieve a fair test. • Select the most appropriate equipment to carry out the investigation and explain simply why they are being used. • Describe in simple terms how to investigate a given scientific question (write step-by-step instructions). • Make suggestions for safety rules related to you, others and to the work being carried out and act on them.	• Identify the most relevant control variables. • Select and identify the independent and the dependent variable. • Describe how to investigate a given scientific question (write step-by-step instructions). • Explain why you have chosen x number of repeats/observations. • Choose an appropriate range, numbers and values for measurements/observations. • On your own identify the risks involved in your investigations and write safety rules to follow.	• Write your own question to investigate. Identify all possible variables, explain why some are difficult to control and how you will attempt to control them. • Select and identify the independent variable. Select and identify the dependent variable. • Explain what you should do, if you identify outliers during an investigation. • On your own identify the risks involved in your investigations and write safety rules to follow; use hazcards to help you write them.	• Explain your choice of strategy for investigating different kinds of scientific questions, using your scientific knowledge and understanding. • Choose a method which will produce accurate, precise and reliable results. • Explain why you have chosen x number of repeats/ observations. • On your own identify the risks involved in your investigations and write safety rules to follow; use hazcards/teachers/technicians/ websites to help you write them.

Science: AF5 Analysis and Evaluation				
	Foundation (1-3)	**Developing (4-5)**	**Secure (6-7)**	**Excellence (8-9)**
End of Year 7	• Recognise simple patterns in observations or in data from tables/pie/bar charts. • With support, suggest a link for observations to a scientific reason.	• Describe what was observed in the experiments/ investigations. • Suggest some improvements to the experiment/ investigation.	• Recognise patterns in observations (what you see) or in data from line graphs. • Describe, in simple terms, conclusions from data (numbers) presented in tables, graphs, diagrams etc. • Suggest some improvements to the experiment/ investigation giving reasons.	• Recognise patterns in observations (what you see) or in data from line graphs and identify outliers (anomalous results). • Describe conclusions that come from/use tables, line graphs etc. • Evaluate, in simple terms, how well the experiment/investigation was carried out and suggest some improvements giving reasons.
End of Year 8	• Recognise simple patterns in observations or in data from tables/pie/bar charts. • With support, link your observations to a scientific reason e.g. magnesium produced the most bubbles (observations), this is because it is the most reactive metal from the five used (cause) and therefore reacted the most with the hydrochloric acid (effect) to produce the most gas. • Suggest some improvements to the experiment/ investigation.	• Recognise patterns in observations (what you see) or in data from line graphs. • Describe, in simple terms, conclusions from data presented in tables, graphs, diagrams etc. • Suggest some improvements to your experiment/ investigation giving reasons.	• Work out averages from your data and use them to write conclusions/draw graphs. • Recognise patterns in observations or in data from line graphs and identify outliers (anomalous results). • Evaluate, in simple terms, how well the experiment/investigation was carried out and suggest some improvements to the experiment/investigation giving reasons.	• Suggest reasons based on scientific knowledge and understanding for any outliers (anomalous results) found in the evidence. • Describe conclusions that fit the pattern of your evidence and explain them using scientific knowledge and understanding (e.g. from F example, the scientific knowledge and understanding would be an explanation of the collision theory and rates of reaction). • Make valid comments on the quality of the data i.e. is it reliable, how do you
End of Year 9	• Recognise simple patterns in observations or in data from tables/pie/bar charts. • Describe, in simple terms, conclusions from data (numbers) presented in tables, graphs, diagrams etc. • Suggest some improvements to the experiment/investigation giving reasons.	• Work out averages from the data and use them to write conclusions/draw graphs. • Recognise patterns in observations or in data from line graphs and identify outliers (anomalous results). • Evaluate, in simple terms, how well the experiment/ investigation was carried out and suggest some improvements to the experiment/investigation giving reasons.	• Explain how data can be interpreted in different ways and how unexpected outcomes could be significant e.g. Hooke's law changes in behaviour after the elastic region. • Describe quantitative relationships (e.g. as concentrations double the rate of reaction doubles) and use this to make more predictions. • Make valid comments on the quality of your data i.e. is it reliable, how do you know? What do the range bars show? Is the range of data sufficient? • Suggest and explain improvements to your experiment/investigation which will improve the reliability of evidence collected giving reasons.	• Give scientific explanations for unexpected observations/ measurements which allow for outliers (anomalous results). • Carry out mathematical calculations which help identify relationships between variables. • Critically interpret and evaluate conflicting evidence. • Suggest and show how improvements to the experiment/investigation will take the investigation further using detailed scientific knowledge and understanding.