

Name:

	AF1 – Thinking scientifically	AF2 – Understanding the applications and implications of science	AF3 – Communicating and collaborating in science	AF4 – Using investigative approaches	AF5 – Working critically with evidence
Level 8	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Describe or explain processes or phenomena, logically and in detail, making use of abstract ideas and models from different areas of science Select and justify an appropriate approach to evaluating the relative importance of a number of different factors in explanations or arguments Analyse the development of scientific theories through the emergence of new, accepted ideas and evidence 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Describe ways in which the values of a society influence the nature of the science developed in that society or period of history Evaluate the effects of scientific or technological developments on society as a whole Explain the unintended consequences that may arise from scientific and technological developments Make balanced judgements about particular scientific or technological developments by evaluating the economic, ethical/moral, social or cultural implications 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Critically evaluate information and evidence from various sources, explaining limitations, misrepresentation or lack of balance Present robust and well structured explanations, arguments or counter arguments in a variety of ways Suggest the specialisms and skills that would be needed to solve particular scientific problems or to generate particular new scientific or technological developments 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Justify their choice of strategies for investigating different kinds of scientific questions, using scientific knowledge and understanding Choose and justify data collection methods that minimise error, and produce precise and reliable data Adapt their approaches to practical work to control risk by consulting appropriate resources and expert advice 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Propose scientific explanations for unexpected observations or measurements, making allowances for anomalies Process data, including using multi-step calculations and compound measures, to identify complex relationships between variables Critically interpret, evaluate and synthesise conflicting evidence Suggest and justify improvements to experimental procedures using detailed scientific knowledge and understanding and suggest coherent strategies to take particular investigations further
Level 7	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Make explicit connections between abstract ideas and/or models in explaining processes or phenomena Employ a systematic approach in deciding the relative importance of a number of scientific factors when explaining processes or phenomena Explain how different pieces of evidence support accepted scientific ideas or contribute to questions that science cannot fully answer Explain the processes by which ideas and evidence are accepted or rejected by the scientific community 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Suggest ways in which scientific and technological developments may be influenced Explain how scientific discoveries can change worldviews Suggest economic, ethical/moral, social or cultural arguments for and against scientific or technological developments Explain how creative thinking in science and technology generates ideas for future research and development 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Explain how information or evidence from various sources may be manipulated in order to influence interpretation Effectively represent abstract ideas using appropriate symbols, flow diagrams and different kinds of graphs in presenting explanations and arguments Explain how scientists with different specialisms and skills have contributed to particular scientific or technological developments 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Formulate questions or ideas that can be investigated by synthesising information from a range of sources Identify key variables in complex contexts, explaining why some cannot readily be controlled and planning appropriate approaches to investigations to take account of this Explain how to take account of sources of error in order to collect reliable data Recognise the need for risk assessments and consult, and act on, appropriate sources of information 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Explain how data can be interpreted in different ways and how unexpected outcomes could be significant Identify quantitative relationships between variables, using them to inform conclusions and make further predictions Assess the strength of evidence, deciding whether it is sufficient to support a conclusion Explain ways of modifying working methods to improve reliability
Level 6	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Use abstract ideas or models or multiple factors when explaining processes or phenomena Identify the strengths and weaknesses of particular models Describe some scientific evidence that supports or refutes particular ideas or arguments, including those in development Explain how new scientific evidence is discussed and interpreted by the scientific community and how this may lead to changes in scientific ideas 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Describe how different decisions on the uses of scientific and technological developments may be made in different economic, social or cultural contexts Explain how societies are affected by particular scientific applications or ideas Describe how particular scientific or technological developments have provided evidence to help scientists pose and answer further questions Describe how aspects of science are applied in particular jobs or roles 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Identify lack of balance in the presentation of information or evidence Choose forms to communicate qualitative or quantitative data appropriate to the data and the purpose of the communication Distinguish between data and information from primary sources, secondary sources and simulations, and present them in the most appropriate form 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Apply scientific knowledge and understanding in the planning of investigations, identifying significant variables and recognising which are independent and which are dependent Justify their choices of data collection method and proposed number of observations and measurements Collect data choosing appropriate ranges, numbers and values for measurements and observations Independently recognise a range of familiar risks and take action to control them 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Suggest reasons based on scientific knowledge and understanding for any limitations or inconsistencies in evidence collected Select and manipulate data and information and use them to contribute to conclusions Draw conclusions that are consistent with the evidence they have collected and explain them using scientific knowledge and understanding Make valid comments on the quality of their data
Level 5	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Use abstract ideas or models or more than one step when describing processes or phenomena Explain processes or phenomena, suggest solutions to problems or answer questions by drawing on abstract ideas or models Recognise scientific questions that do not yet have definitive answers Identify the use of evidence and creative thinking by scientists in the development of scientific ideas 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Describe different viewpoints a range of people may have about scientific or technological developments Indicate how scientific or technological developments may affect different groups of people in different ways Identify ethical or moral issues linked to scientific or technological developments Link applications of science or technology to their underpinning scientific ideas 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Distinguish between opinion and scientific evidence in contexts related to science, and use evidence rather than opinion to support or challenge scientific arguments Decide on the most appropriate formats to present sets of scientific data, such as using line graphs for continuous variables Use appropriate scientific and mathematical conventions and terminology to communicate abstract ideas Suggest how collaborative approaches to specific experiments or investigations may improve the evidence collected 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Recognise significant variables in investigations, selecting the most suitable to investigate Explain why particular pieces of equipment or information sources are appropriate for the questions or ideas under investigation Repeat sets of observations or measurements where appropriate, selecting suitable ranges and intervals Make, and act on, suggestions to control obvious risks to themselves and others 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Interpret data in a variety of formats, recognising obvious inconsistencies Provide straightforward explanations for differences in repeated observations or measurements Draw valid conclusions that utilise more than one piece of supporting evidence, including numerical data and line graphs Evaluate the effectiveness of their working methods, making practical suggestions for improving them
Level 4	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Use scientific ideas when describing simple processes or phenomena Use simple models to describe scientific ideas Identify scientific evidence that is being used to support or refute ideas or arguments 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Describe some simple positive and negative consequences of scientific and technological developments Recognise applications of specific scientific ideas Identify aspects of science used within particular jobs or roles 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Select appropriate ways of presenting scientific data Use appropriate scientific forms of language to communicate scientific ideas, processes or phenomena Use scientific and mathematical conventions when communicating information or ideas 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Decide when it is appropriate to carry out fair tests in investigations Select appropriate equipment or information sources to address specific questions or ideas under investigation Make sets of observations or measurements, identifying the ranges and intervals used Identify possible risks to themselves and others 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Identify patterns in data presented in various formats, including line graphs Draw straightforward conclusions from data presented in various formats Identify scientific evidence they have used in drawing conclusions Suggest improvements to their working methods, giving reasons
Level 3	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Identify differences, similarities or changes related to simple scientific ideas, processes or phenomena Respond to ideas given to them to answer questions or suggest solutions to problems Represent things in the real world using simple physical models Use straightforward scientific evidence to answer questions, or to support their findings 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Explain the purposes of a variety of scientific or technological developments Link applications to specific characteristics or properties Identify aspects of our lives, or of the work that people do, which are based on scientific ideas 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Present simple scientific data in more than one way, including tables and bar charts Use scientific forms of language when communicating simple scientific ideas, processes or phenomena Identify simple advantages of working together on experiments or investigations 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Identify one or more control variables in investigations from those provided Select equipment or information sources from those provided to address a question or idea under investigation Make some accurate observations or whole number measurements relevant to questions or ideas under investigation Recognise obvious risks when prompted 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Identify straightforward patterns in observations or in data presented in various formats, including tables, pie and bar charts Describe what they have found out in experiments or investigations, linking cause and effect Suggest improvements to their working methods
Level 2	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Draw on their observations and ideas to offer answers to questions Make comparisons between basic features or components of objects, living things or events Sort and group objects, living things or events on the basis of what they have observed Respond to suggestions to identify some evidence (in the form of information, observations or measurements) needed to answer a question 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Express personal feelings or opinions about scientific or technological phenomena Describe, in familiar contexts, how science helps people do things Identify people who use science to help others Identify scientific or technological phenomena and say whether or not they are helpful 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Present their ideas and evidence in appropriate ways Respond to prompts by using simple texts and electronic media to find information Use simple scientific vocabulary to describe their ideas and observations Work together on an experiment or investigation and recognise contributions made by others 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Make some suggestions about how to find things out or how to collect data to answer a question or idea they are investigating Identify things to measure or observe that are relevant to the question or idea they are investigating Correctly use equipment provided to make observations and measurements Make measurements, using standard or non-standard units as appropriate 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Say what happened in their experiment or investigation Say whether what happened was what they expected, acknowledging any unexpected outcomes Respond to prompts to suggest different ways they could have done things
Level 1	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Ask questions stimulated by their exploration of their world Recognise basic features of objects, living things or events Draw on their everyday experience to help answer questions Respond to suggestions to identify some evidence (in the form of information, observations or measurements) that has been used to answer a question 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Identify a link to science in familiar objects or contexts Recognise scientific and technological developments that help us 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Use everyday terms to describe simple features or actions of objects, living things or events they observe Present evidence they have collected in simple templates provided for them Communicate simple features or components of objects, living things or events they have observed in appropriate forms Share their own ideas and listen to the ideas of others 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Respond to prompts by making some simple suggestions about how to find an answer or make observations Use their senses and simple equipment to make observations 	<p>Across a range of contexts and practical situations pupils:</p> <ul style="list-style-type: none"> Respond to prompts to say what happened Say what has changed when observing objects, living things or events