

Assessing pupils' progress in science at Key Stage 3

Assessment criteria: science

	AF1 – Thinking scientifically	AF2 – Understanding the applications and implications of science	AF3 – Communicating and collaborating in science	AF4 – Using investigative approaches	AF5 – Working with evidence
Level 8	<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 	<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 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Make balanced judgements about particular scientific or technological developments by evaluating Lesson 5.3 Activity 5 Lesson 5.4 Activity 1,2,3,4 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 	<ul style="list-style-type: none"> Critically evaluate information and evidence from various sources, explaining limitations, misrepresentation or lack of balance Lesson 5.3 Activity 5 Lesson 5.3 Homework Present robust and well structured explanations, arguments or counter arguments in a variety of ways Lesson 5.3 Homework Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Suggest the specialisms and skills that would be needed to solve particular scientific problems or to Lesson 5.8 Activity 3 	<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 	<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	<ul style="list-style-type: none"> Make explicit connections between abstract ideas and/or models in explaining processes or phenomena Lesson 5.1 Activity 5 Lesson 5.2 Activity 1 Lesson 5.6 Homework Lesson 5.8 Activity 1 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 Lesson 5.7 Activity 2,3,4 Explain the processes by which ideas and evidence are accepted or rejected by the scientific community 	<ul style="list-style-type: none"> Suggest ways in which scientific and technological developments may be influenced Lesson 5.4 Activity 1,2,3,4 Lesson 5.6 Activity 2,3,5 Explain how scientific discoveries can change worldviews Lesson 5.6 Activity 2,3,5 Suggest economic, ethical/moral, social or cultural arguments for and against scientific or technological developments Lesson 5.3 Activity 5 Lesson 5.4 Activity 1,2,3,4 Lesson 5.7 Activity 2,3,4 Explain how creative thinking in science and technology generates ideas for future research and development 	<ul style="list-style-type: none"> Explain how information or evidence from various sources may have been manipulated in order to influence interpretation Lesson 5.3 Homework Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Effectively represent abstract ideas using appropriate symbols, flow diagrams and different kinds of graphs in presenting explanations and arguments Lesson 5.2 Activity 1 Explain how scientists with different specialisms and skills have contributed to particular scientific or technological developments Lesson 5.8 Activity 3 	<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 	<ul style="list-style-type: none"> Explain how data can be interpreted in different ways and how unexpected outcomes could be significant Lesson 5.6 Activity 2,3,5 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 Lesson 5.1 Activity 2,3,4 Lesson 5.5 Activity 4 & homework Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Explain ways of modifying working methods to improve reliability Lesson 5.1 Activity 2,3,4 Lesson 5.5 Activity 4 & homework Lesson 5.7 Activity 2,3,4
Level 6	<ul style="list-style-type: none"> Use abstract ideas or models or multiple factors when explaining processes or phenomena Lesson 5.1 Activity 5 Lesson 5.2 Activity 1 Lesson 5.5 Activity 2 Identify the strengths and weaknesses of particular models Lesson 5.6 Homework Describe some scientific evidence that supports or refutes particular ideas or arguments, including those in development Lesson 5.7 Activity 2,3,4 Explain how new scientific evidence is discussed and interpreted by the scientific community and how this may lead to changes in scientific ideas 	<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 Lesson 5.3 Activity 5 Lesson 5.4 Activity 1,2,3,4 Lesson 5.6 Activity 2,3,5 Explain how societies are affected by particular scientific applications or ideas Lesson 5.3 Activity 5 Lesson 5.4 Activity 1,2,3,4 Lesson 5.5 Activity 2 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Describe how particular scientific or technological developments have provided evidence to help scientists pose and answer further questions Lesson 5.7 Activity 2,3,4 Describe how aspects of science are applied in particular jobs or roles Lesson 5.2 Activity 1 Lesson 5.5 Activity 3 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Lesson 5.8 Activity 3 	<ul style="list-style-type: none"> Identify lack of balance in the presentation of information or evidence Lesson 5.3 Homework Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Choose forms to communicate qualitative or quantitative data appropriate to the data and the purpose of the communication Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 1 Lesson 5.4 Activity 1,2,3,4 Lesson 5.5 Activity 2 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Distinguish between data and information from primary sources, secondary sources and simulations, and present them in the most appropriate form Lesson 5.3 Homework Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 	<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 Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Justify their choices of data collection method and proposed number of observations and measurements Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Collect data choosing appropriate ranges, numbers and values for measurements and observations Lesson 5.1 Activity 2,3,4 Independently recognise a range of familiar risks and take action to control them Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 	<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 Lesson 5.2 Activity 1 Lesson 5.3 Activity 1,2 Draw conclusions that are consistent with the evidence they have collected and explain them using scientific knowledge and understanding Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 1 Lesson 5.2 Activity 2 Lesson 5.3 Activity 1,2 Lesson 5.4 Activity 1,2,3,4 Lesson 5.5 Activity 4 & homework Make valid comments on the quality of their data Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Lesson 5.5 Activity 4 & homework Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4

<p>Level 5</p>	<ul style="list-style-type: none"> Use abstract ideas or models or more than one step when describing processes or phenomena Lesson 5.1 Activity 5 Lesson 5.6 Homework 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 Lesson 5.7 Activity 2,3,4 Identify the use of evidence and creative thinking by scientists in the development of scientific ideas 	<ul style="list-style-type: none"> Describe different viewpoints a range of people may have about scientific or technological developments Lesson 5.3 Activity 5 Lesson 5.4 Activity 1,2,3,4 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Indicate how scientific or technological developments may affect different groups of people in different ways Lesson 5.3 Activity 5 Lesson 5.4 Activity 1,2,3,4 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Identify ethical or moral issues linked to scientific or technological developments Lesson 5.3 Activity 5 Lesson 5.4 Activity 1,2,3,4 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Link applications of science or technology to their underpinning scientific ideas Lesson 5.2 Activity 1 Lesson 5.4 Activity 1,2,3,4 Lesson 5.5 Activity 2 	<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 Lesson 5.4 Activity 1,2,3,4 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Decide on the most appropriate formats to present sets of scientific data, such as using line graphs for continuous variables Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 1 Use appropriate scientific and mathematical conventions and terminology to communicate abstract ideas Lesson 5.2 Activity 1 Suggest how collaborative approaches to specific experiments or investigations may improve the evidence collected Lesson 5.4 Activity 1,2,3,4 Lesson 5.8 Activity 3 	<ul style="list-style-type: none"> Recognise significant variables in investigations, selecting the most suitable to investigate Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Explain why particular pieces of equipment or information sources are appropriate for the questions or ideas under investigation Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Repeat sets of observations or measurements where appropriate, selecting suitable ranges and intervals Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Make, and act on, suggestions to control obvious risks to themselves and others Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 	<ul style="list-style-type: none"> Interpret data in a variety of formats, recognising obvious inconsistencies Lesson 5.3 Activity 1,2 Provide straightforward explanations for differences in repeated observations or measurements Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Draw valid conclusions that utilise more than one piece of supporting evidence, including numerical data and line graphs Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 1 Lesson 5.3 Activity 1,2 Lesson 5.4 Activity 1,2,3,4 Evaluate the effectiveness of their working methods, making practical suggestions for improving them Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Lesson 5.5 Activity 4 & homework Lesson 5.7 Activity 2,3,4
<p>Level 4</p>	<ul style="list-style-type: none"> Use scientific ideas when describing simple processes or phenomena Lesson 5.2 Activity 1 Use simple models to describe scientific ideas Lesson 5.6 Homework Lesson 5.8 Activity 1 Identify scientific evidence that is being used to support or refute ideas or arguments Lesson 5.7 Activity 2,3,4 	<ul style="list-style-type: none"> Describe some simple positive and negative consequences of scientific and technological developments Lesson 5.3 Activity 5 Lesson 5.4 Activity 1,2,3,4 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Recognise applications of specific scientific ideas Lesson 5.2 Activity 1 Lesson 5.3 Activity 5 Lesson 5.4 Activity 1,2,3,4 Lesson 5.5 Activity 2 Lesson 5.6 Activity 2,3,5 Identify aspects of science used within particular jobs or roles Lesson 5.2 Activity 1 Lesson 5.5 Activity 3 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Lesson 5.8 Activity 3 	<ul style="list-style-type: none"> Select appropriate ways of presenting scientific data Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 1 Use appropriate scientific forms of language to communicate scientific ideas, processes or phenomena Lesson 5.2 Activity 1 Lesson 5.4 Activity 1,2,3,4 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Use scientific and mathematical conventions when communicating information or ideas Lesson 5.5 Activity 2 	<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 Lesson 5.1 Activity 2,3,4 Make sets of observations or measurements, identifying the ranges and intervals used Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Identify possible risks to themselves and others Lesson 5.1 Activity 2,3,4 	<ul style="list-style-type: none"> Identify patterns in data presented in various formats, including line Graphs Lesson 5.3 Activity 1,2 Draw straightforward conclusions from data presented in various Formats Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 1 Lesson 5.2 Activity 2 Lesson 5.3 Activity 1,2 Identify scientific evidence they have used in drawing conclusions Lesson 5.5 Activity 4 & homework Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Suggest improvements to their working methods, giving reasons Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Lesson 5.5 Activity 4 & homework Lesson 5.7 Activity 2,3,4
<p>Level 3</p>	<ul style="list-style-type: none"> Identify differences, similarities or changes related to simple scientific ideas, processes or phenomena Lesson 5.2 Activity 1 Respond to ideas given to them to answer questions or suggest solutions to problems Lesson 5.7 Activity 2,3,4 Represent things in the real world using simple physical models Lesson 5.6 Homework Lesson 5.8 Activity 1 Use straightforward scientific evidence to answer questions, or to support their findings Lesson 5.7 Activity 2,3,4 	<ul style="list-style-type: none"> Explain the purposes of a variety of scientific or technological Developments Lesson 5.3 Activity 5 Lesson 5.4 Activity 1,2,3,4 Lesson 5.5 Activity 2 Lesson 5.6 Activity 2,3,5 Link applications to specific characteristics or properties Lesson 5.2 Activity 1 Lesson 5.4 Activity 1,2,3,4 Lesson 5.5 Activity 2 Lesson 5.6 Activity 2,3,5 Identify aspects of our lives, or of the work that people do, which are based on scientific ideas Lesson 5.2 Activity 1 Lesson 5.5 Activity 3 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Lesson 5.8 Activity 3 	<ul style="list-style-type: none"> Present simple scientific data in more than one way, including tables and bar charts Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 1 Lesson 5.3 Activity 1,2 Lesson 5.4 Activity 1,2,3,4 Lesson 5.5 Activity 2 Use scientific forms of language when communicating simple scientific ideas, processes or phenomena Lesson 5.2 Activity 1 Lesson 5.4 Activity 1,2,3,4 Lesson 5.5 Activity 2 Lesson 5.6 Activity 2,3,5 Lesson 5.7 Activity 2,3,4 Identify simple advantages of working together on experiments or investigations Lesson 5.8 Activity 3 	<ul style="list-style-type: none"> Identify one or more control variables in investigations from those Provided Lesson 5.1 Activity 2,3,4 Select equipment or information sources from those provided to address a question or idea under investigation Lesson 5.1 Activity 2,3,4 Make some accurate observations or whole number measurements relevant to questions or ideas under investigation Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Recognise obvious risks when prompted 	<ul style="list-style-type: none"> Identify straightforward patterns in observations or in data presented in various formats, including tables, pie and bar charts Lesson 5.3 Activity 1,2 Describe what they have found out in experiments or investigations, linking cause and effect Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Lesson 5.5 Activity 4 & homework Lesson 5.7 Activity 2,3,4 Suggest improvements to their working methods Lesson 5.1 Activity 2,3,4 Lesson 5.2 Activity 2 Lesson 5.5 Activity 4 & homework Lesson 5.7 Activity 2,3,4