| Year Group 9 Subject Science Assessment Framework | | | | | |
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| **Assessment Objective** | Grade 1 | Grade 2-3 | Grade 4-5 | Grade 6-7 | Grade 8+ |
| **Thinking scientifically**<br><br>**Test** | • **Use** scientific ideas when describing simple processes or phenomena<br>• **Use** simple models to describe scientific ideas<br>• **Identify** scientific evidence that is being used to support or refute ideas or arguments | • **Use** abstract ideas or models or more than one step when describing processes or phenomena<br>• **Explain** processes or phenomena, suggest solutions to problems or answer questions by drawing on abstract ideas or models<br>• **Recognise** scientific questions that do not yet have definitive answers<br>• **Identify** the use of evidence and creative thinking by scientists in the development of scientific ideas | • **Use** abstract ideas or models or multiple factors when explaining processes or phenomena<br>• **Identify** the strengths and weaknesses of particular models<br>• **Describe** some scientific evidence that supports or refutes particular ideas or arguments, including those in development<br>• **Explain** how new scientific evidence is discussed and interpreted by the scientific community and how this may lead to changes in scientific ideas | • **Make** explicit connections between abstract ideas and/or models in explaining processes or phenomena<br>• **Employ** a systematic approach in deciding the relative importance of a number of scientific factors when explaining processes or phenomena<br>• **Explain** how different pieces of evidence support accepted scientific ideas or contribute to questions that science cannot fully answer<br>• **Explain** the processes by which ideas and evidence are accepted or rejected by the scientific community | • **Describe** or **explain** processes or phenomena, logically and in detail, making use of abstract ideas and models from different areas of science<br>• **Select and justify** an appropriate approach to evaluating the relative importance of a number of different factors in explanations or arguments<br>• **Analyse** the development of scientific theories through the emergence of new, accepted ideas and evidence |
| **Understanding the applications and implications of science**<br><br>**Debates** | • **Describe** some simple positive and negative consequences of scientific and technological developments<br>• **Recognise** applications of specific scientific ideas<br>• **Identify** aspects of science used within particular jobs or roles | • **Describe** different viewpoints a range of people may have about scientific or technological developments<br>• **Indicate** how scientific or technological developments may affect different groups of people in different ways<br>• **Identify** ethical or moral issues linked to scientific or | • **Describe** how different decisions on the uses of scientific and technological developments may be made in different economic, social or cultural contexts<br>• **Explain** how societies are affected by particular scientific applications or ideas | • **Suggest** ways in which scientific and technological developments may be influenced<br>• **Explain** how scientific discoveries can change worldviews<br>• **Suggest** economic, ethical/moral, social or cultural arguments for and against scientific or technological developments | • **Describe** ways in which the values of a society influence the nature of the science developed in that society or period of history<br>• **Evaluate** the effects of scientific or technological developments on society as a whole<br>• **Explain** the unintended consequences that may |

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| | | technological developments<br>• **Link** applications of science or technology to their underpinning scientific ideas | • **Describe** how particular scientific or technological developments have provided evidence to help scientists pose and answer further questions<br>• **Describe** how aspects of science are applied in particular jobs or roles | • **Explain** how creative thinking in science and technology generates ideas for future research and development | arise from scientific and technological developments<br>• **Make balanced judgements** about particular scientific or technological developments by evaluating the economic, ethical/ moral, social or cultural implications |
| **Communicating and collaborating in science**<br><br>**Peer/LORIC?** | • **Select** appropriate ways of presenting scientific data<br>• **Use** appropriate scientific forms of language to communicate scientific ideas, processes or phenomena<br>• **Use** scientific and mathematical conventions when communicating information or ideas | • **Distinguish** between opinion and scientific evidence in contexts related to science, and use evidence rather than opinion to support or challenge scientific arguments<br>• **Decide** on the most appropriate formats to present sets of scientific data, such as using line graphs for continuous variables<br>• **Use** appropriate scientific and mathematical conventions and terminology to communicate abstract ideas<br>• **Suggest** how collaborative approaches to specific experiments or investigations may improve the evidence collected | • **Identify** lack of balance in the presentation of information or evidence<br>• **Choose** forms to communicate qualitative or quantitative data appropriate to the data and the purpose of the communication<br>• **Distinguish** between data and information from primary sources, secondary sources and simulations, and present them in the most appropriate form | • **Explain** how information or evidence from various sources may been manipulated in order to influence interpretation<br>• **Effectively represent** abstract ideas using appropriate symbols, flow diagrams and different kinds of graphs in presenting explanations and arguments<br>• **Explain** how scientists with different specialisms and skills have contributed to particular scientific or technological developments | • Critically **evaluate** information and evidence from various sources, explaining limitations, misrepresentation or lack of balance<br>• **Present** robust and well-structured explanations, arguments or counter arguments in a variety of ways<br>• **Suggest** the specialisms and skills that would be needed to solve particular scientific problems or to generate particular new scientific or technological developments |

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| **Using investigative approaches**<br><br>**Investigation** | • **Decide** when it is appropriate to carry out fair tests in investigations<br>• **Select** appropriate equipment or information sources to address specific questions or ideas under investigation<br>• **Make** sets of observations or measurements, identifying the ranges and intervals used<br>• **Identify** possible risks to themselves and others | • **Recognise** significant variables in investigations, selecting the most suitable to investigate<br>• **Explain** why particular pieces of equipment or information sources are appropriate for the questions or ideas under investigation<br>• Repeat sets of observations or measurements where appropriate, selecting suitable ranges and intervals<br>• **Make,** and act on, suggestions to control obvious risks to themselves and others | • **Apply** scientific knowledge and understanding in the planning of investigations, identifying significant variables and recognising which are independent and which are dependent<br>• **Justify** their choices of data collection method and proposed number of observations and measurements<br>• **Collect data** choosing appropriate ranges, numbers and values for measurements and observations<br>• **Independently recognise** a range of familiar risks and take action to control them | • **Formulate** questions or ideas that can be investigated by synthesising information from a range of sources<br>• **Identify** key variables in complex contexts, explaining why some cannot readily be controlled and planning appropriate approaches to investigations to take account of this<br>• **Explain** how to take account of sources of error in order to collect reliable data<br>• **Recognise** the need for risk assessments and consult, and act on, appropriate sources of information | • **Justify** their choice of strategies for investigating different kinds of scientific questions, using scientific knowledge and understanding<br>• **Choose** and **justify** data collection methods that minimise error, and produce precise and reliable data<br>• **Adapt** their approaches to practical work to control risk by consulting appropriate resources and expert advice |
| **Working critically with evidence**<br><br>**Investigation/Test** | • **Identify** patterns in data presented in various formats, including line graphs<br>• **Draw** straightforward conclusions from data presented in various formats<br>• **Identify** scientific evidence they have used in drawing conclusions<br>• **Suggest** improvements to their working methods, giving reasons | • **Interpret data** in a variety of formats, recognising obvious inconsistencies<br>• **Provide** straightforward explanations for differences in repeated observations or measurements<br>• **Draw** valid conclusions that utilise more than one piece of supporting evidence, including numerical data and line graphs | • **Suggest** reasons based on scientific knowledge and understanding for any limitations or inconsistencies in evidence collected<br>• **Select** and manipulate data and information and use them to contribute to conclusions<br>• **Draw** conclusions that are consistent with the evidence they have collected and explain them using scientific knowledge and understanding | • **Explain** how data can be interpreted in different ways and how unexpected outcomes could be significant<br>• **Identify** quantitative relationships between variables, using them to inform conclusions and make further predictions<br>• **Assess** the strength of evidence, deciding whether it is sufficient to support a conclusion | • **Propose** scientific explanations for unexpected observations or measurements, making allowances for anomalies<br>• **Process** data, including using multi-step calculations and compound measures, to identify complex relationships between variables<br>• **Critically interpret, evaluate and synthesise** conflicting evidence |

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| | | • **Evaluate** the effectiveness of their working methods, making practical suggestions for improving them | • Make valid comments on the quality of their data | • **Explain** ways of modifying working methods to improve reliability | • **Suggest and justify** improvements to experimental procedures using detailed scientific knowledge and understanding and suggest coherent strategies to take particular investigations further |