

Please read the instructions printed at the end of this form. **One** of these sheets, suitably completed, should be attached to the assessed work of **each** candidate.

<b>Unit Title</b>	<b>How scientists test their ideas</b>			<b>Unit Code</b>	<b>R073</b>	<b>Session</b>	Jan / June / Nov	<b>Year</b>				
<b>Centre Name</b>						<b>Centre Number</b>						
<b>Candidate Name</b>						<b>Candidate Number</b>						
Criteria						Teacher Comments			Mark	Page No		
LO1: Be able to plan a scientific investigation												
MB1: 1 – 6 marks		MB2: 7 – 11 marks		MB3: 12 – 15 marks								
<ul style="list-style-type: none"> <li>• <b>Limited</b> plan includes equipment and techniques to be used</li> <li>• Plan provides a 'fair test'</li> <li>• Identifies how <b>some</b> errors will be minimised</li> <li>• <b>Some</b> sources of secondary data/information identified</li> </ul>		<ul style="list-style-type: none"> <li>• Plan gives <b>sufficient detail</b> for investigation to be repeated, including choices of:                             <ul style="list-style-type: none"> <li>o equipment, including instrumentation</li> <li>o range and number of data points</li> <li>o number of replicates</li> <li>o control of variables to result in the collection of data of an appropriate quality</li> </ul> </li> <li>• <b>Some</b> explanation of how errors will be minimised</li> <li>• <b>Range of relevant</b> sources of secondary data/information identified</li> </ul>		<ul style="list-style-type: none"> <li>• <b>Comprehensive</b> plan shows scientific understanding in making appropriate choices of:                             <ul style="list-style-type: none"> <li>o equipment, including instrumentation</li> <li>o range and number of data points</li> <li>o number of replicates</li> <li>o control of variables to result in the collection of accurate data to address the scientific problem</li> </ul> </li> <li>• <b>Detailed</b> explanation of:                             <ul style="list-style-type: none"> <li>o how errors will be minimised</li> <li>o variables which cannot be controlled</li> </ul> </li> <li>• <b>Wide range of relevant</b> sources of secondary data/information identified and selection of <b>appropriate</b> sources justified</li> </ul>								
[1 2 3 4 5 6]		[7 8 9 10 11]		[12 13 14 15]								

Criteria			Teacher Comments	Mark	Page No
<b>LO2: Be able to collect scientific data</b>					
<b>MB1: 1 – 4 marks</b>	<b>MB2: 5 – 7 marks</b>	<b>MB3: 8 – 10 marks</b>			
<ul style="list-style-type: none"> <li>• <b>Basic</b> understanding of risks in procedures with only standard laboratory safety precautions identified</li> <li>• <b>Significant</b> teacher intervention required to ensure safety <b>or</b> help set up equipment</li> <li>• Results recorded <b>clearly</b></li> </ul> <p style="text-align: right;">[1 2 3 4]</p>	<ul style="list-style-type: none"> <li>• <b>Some</b> risks in procedures identified and <b>some</b> specific responses suggested to reduce risks</li> <li>• <b>Most</b> risks managed successfully with no significant incidents or accidents and no requirement for teacher intervention</li> <li>• <b>Little support</b> required to set up equipment</li> <li>• Results tabulated to include all data collected, <b>including</b> use of correct headings</li> </ul> <p style="text-align: right;">[5 6 7]</p>	<ul style="list-style-type: none"> <li>• All significant risks in the plan <b>evaluated</b> and <b>reasoned</b> judgements made to reduce risks by use of <b>appropriate</b> specific responses</li> <li>• All risks managed successfully with no incidents or accidents and no requirement for teacher intervention</li> <li>• Measurements taken and recorded to appropriate accuracy and precision using an appropriate format, <b>including</b> use of correct heading and units</li> </ul> <p style="text-align: right;">[8 9 10]</p>			
<b>LO3: Be able to analyse scientific information</b>					
<b>MB1: 1 – 5 marks</b>	<b>MB2: 6 – 9 marks</b>	<b>MB3: 10 – 13 marks</b>			
<ul style="list-style-type: none"> <li>• <b>Some</b> evidence of processing of quantitative data: <ul style="list-style-type: none"> <li>o data presented as <b>simple</b> charts or graphs</li> <li>o use of a <b>simple</b> mathematical technique where appropriate</li> </ul> </li> <li>• <b>Some</b> trends/patterns in the data identified</li> </ul> <p style="text-align: right;">[1 2 3 4 5]</p>	<ul style="list-style-type: none"> <li>• Graphical and mathematical techniques used to reveal patterns in data: <ul style="list-style-type: none"> <li>o charts or graphs used to display data in an <b>appropriate</b> way</li> <li>o <b>correct</b> use of simple mathematical techniques where appropriate</li> <li>o <b>appropriate qualitative</b> treatment of the levels of uncertainty in the data, including identification of any anomalous results</li> </ul> </li> <li>• Main trends/patterns in the data <b>described</b> with reference to quantitative data</li> </ul> <p style="text-align: right;">[6 7 8 9]</p>	<ul style="list-style-type: none"> <li>• <b>Appropriate</b> graphical and mathematical techniques used to reveal patterns in data: <ul style="list-style-type: none"> <li>o <b>appropriate</b> scales and axes used in graphs and data plotted <b>accurately</b>, including where <b>appropriate</b>, use of lines of best fit</li> <li>o correct use of complex mathematical techniques where <b>appropriate</b></li> <li>o <b>appropriate quantitative</b> treatment of levels of uncertainty in the data</li> </ul> </li> <li>• Main trends/patterns in the data described in detail and interpreted correctly with reference to quantitative data and <b>relevant</b> scientific understanding</li> </ul> <p style="text-align: right;">[10 11 12 13]</p>			

Criteria			Teacher Comments	Mark	Page No.
<b>LO4: Be able to evaluate scientific information</b>					
<b>MB1: 1 – 5 marks</b>	<b>MB2: 6 – 9 marks</b>	<b>MB3: 10 – 13 marks</b>			
<ul style="list-style-type: none"> <li>• <b>Limited</b> comments made about the quality of the data and the methods used</li> <li>• <b>Simple</b> conclusion given which is consistent with the data collected and shows <b>limited</b> scientific understanding</li> <li>• There is <b>limited</b> application of skills/knowledge/understanding from other units in the specification</li> </ul> <p style="text-align: right;">[1 2 3 4 5]</p>	<ul style="list-style-type: none"> <li>• <b>Some relevant</b> comments made about the quality of the data including accuracy and sources of error, linked to the methods of collection: <ul style="list-style-type: none"> <li>o limitations in the methods of data collection identified and suggestions for improvements given</li> </ul> </li> <li>• Conclusion given and <b>justified</b> based on an analysis of the data, showing <b>sound</b> understanding of the underlying science</li> <li>• Applies skills / knowledge / understanding from other units in the specification in a way which is <b>mostly relevant</b></li> </ul> <p style="text-align: right;">[6 7 8 9]</p>	<ul style="list-style-type: none"> <li>• <b>Detailed</b> and <b>critical</b> consideration given to the data and methods used to obtain them: <ul style="list-style-type: none"> <li>o sources of error and quality of data <b>discussed</b> and <b>explained</b>, including accuracy, repeatability and uncertainty</li> <li>o limitations of the method identified and suggestions for improvements <b>justified</b></li> </ul> </li> <li>• Conclusion given and <b>justified</b> based on <b>critical</b> analysis of primary and secondary data, clearly linked to <b>relevant</b> scientific understanding <ul style="list-style-type: none"> <li>o identification of conflicting evidence</li> <li>o what further evidence is needed to make the conclusion more secure</li> </ul> </li> <li>• Applies skills / knowledge / understanding from other units in the specification in an <b>effective</b> relevant way</li> </ul> <p style="text-align: right;">[10 11 12 13]</p>			
<b>LO5: Be able to communicate scientific information</b>					
<b>MB1: 1 – 4 marks</b>	<b>MB2: 5 – 7 marks</b>	<b>MB3: 8 – 9 marks</b>			
<ul style="list-style-type: none"> <li>• <b>Limited</b> use of scientific, technical and mathematical language, conventions and symbols</li> <li>• <b>Some</b> errors in grammar, punctuation and spelling</li> <li>• <b>Limited</b> use of diagrams, graphs, flow charts and pictures</li> </ul> <p style="text-align: right;">[1 2 3 4]</p>	<ul style="list-style-type: none"> <li>• Information is presented in a <b>structured</b> format</li> <li>• <b>Sound</b> use of scientific, technical and mathematical language, conventions and symbols</li> <li>• <b>Occasional</b> errors in grammar, punctuation and spelling</li> <li>• <b>Some appropriate</b> use of diagrams, graphs, flow charts and pictures</li> </ul> <p style="text-align: right;">[5 6 7]</p>	<ul style="list-style-type: none"> <li>• Information presented is <b>clear</b>, well organised and structured, and in a <b>coherent</b> format</li> <li>• Scientific, technical and mathematical language, conventions and symbols are used <b>effectively</b></li> <li>• <b>Few</b>, if any, errors in grammar, punctuation and spelling</li> <li>• Diagrams, graphs, flow charts and pictures are used <b>appropriately</b> and accurately</li> </ul> <p style="text-align: right;">[8 9]</p>			
<b>Total/60</b>					

If this is a re-sit, please tick		Session and Year of previous submission	Jan / June / Nov	2	0		Please tick to indicate this work has been standardised internally	
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Please note: This form may be updated on an annual basis. The current version of this form will be available on the OCR website ([www.ocr.org.uk](http://www.ocr.org.uk)).

### Guidance on Completion of this Form

- 1 **One** sheet should be used for each candidate.
- 2 Please ensure that the appropriate boxes at the top of the form are completed.
- 3 Please enter *specific* page numbers where evidence can be found in the portfolio, and where possible, indicate to which part of the text in the mark band the evidence relates.
- 4 Circle the mark awarded for each strand of the marking criteria in the appropriate box and also enter the circled mark in the final column.
- 5 Add the marks for the strands together to give a total out of 60. Enter this total in the relevant box.