

Commentary on candidate evidence

Candidate 1 – Range of projectiles

The evidence for this candidate has achieved the following marks for each section of this course assessment component.

Section	Expected Response	Maximum mark	Mark awarded	Commentary
1 Aim	An aim that describes clearly the purpose of the investigation.	1	1	The candidate's aim clearly describes the purpose of the investigation.
2 Underlying physics	An account of physics relevant to the aim of the investigation.	3	2	<p>The candidate has shown a reasonable understanding of the physics relevant to the aim, showing an awareness of both the horizontal and vertical motion of a projectile, the factor affecting the time of flight and the horizontal and vertical components of velocity.</p> <p>The candidate has, however, made the statement 'range = $v \times t$', where v is the speed it is fired at which is true only if the projectile is fired horizontally. In addition, the candidate has not defined θ (as the angle between the plane of launch and either the horizontal or the vertical).</p>

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3 Data collection and handling				
3a Brief description	A brief description of the approach used to collect experimental data.	1	1	The candidate's description of their experiment is given in sufficient detail for the marker to be able to visualise the nature of the experiment. The lack of clarity of θ has been penalised in the 'Underlying physics' section, and is implied by the relationships stated for $v_{\text{horizontal}}$ and v_{vertical} .
3b Sufficient raw data	Sufficient raw data from the candidate's experiment.	1	1	In this experiment, it is appropriate to make repeated measurements of range, and the candidate has done this. The range of the independent variable is adequate.
3c Data table	Data from the candidate's experiment is presented in a correctly produced table.	1	0	Only one column in the candidate's table has clear headings. The column headed 'Metres' should be headed 'Horizontal range (m)'. The candidate has given a unit for range, and included a unit for angle of launch.
3d Mean/derived values	Mean and/ or derived values are calculated correctly.	1	0	The candidate has calculated an average value of range for each of the angles of launch. A sample calculation is shown, which is good practice. The average value in the fourth line of the table, however, has been incorrectly calculated (1.63 should

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				be 1.61), and so the mark for this section is not awarded.
3e Internet/literature data	Data relevant to the experiment from an internet/literature source.	1	1	The candidate has included data from the internet which is relevant to their experiment.
3f Reference	A reference for the source of the internet/literature data.	1	1	The candidate has given a full URL for the website page containing the data given in the report.
4 Graphical presentation				
4a Appropriate format	A graph of the appropriate format.	1	1	The candidate has drawn a scatter graph, which is an appropriate format for the experimental data.
4b Suitable scales	The axis/axes has/have suitable scales(s).	1	1	The candidate has used suitable linear scales for the axes of the graph. The candidate has begun the scaling of the y-axis with 1.0 to make better use of the graph paper. This is acceptable.
4c Suitable labels and units	The axes of the graph have suitable labels and units.	1	0	The candidate has labelled the axes of the graph correctly, but has not included a unit for angle of launch on the x-axis. A missing unit on the axis of the graph is penalised in this section.

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4d Accurately plotted data points	Accurately plotted data points and, where appropriate, a line of best fit.	1	0	The candidate has accurately plotted four of the five data points in the table (including the incorrectly calculated average value 1.63), but the data point (30, 1.58) is not plotted accurately, and so the mark in this section is withheld. The line of best fit is acceptable.
5 Analysis	A valid comparison of the experimental data with data from the internet/ literature source.	1	1	The candidate has stated 'Both graphs have the same shape with the range getting bigger then smaller', which is acceptable as a comparison of the experimental and internet data.
6 Conclusion	A valid conclusion that relates to the aim and is supported by the data in the report.	1	1	The candidate has made a conclusion of the variation of range with angle of launch based on data from both their experiment and the internet.
7 Evaluation	An evaluation of the experimental procedure.	2	2	The candidate has identified a factor which had a significant effect on the accuracy of the experiment, and has explained what was done to minimise this factor.
8 Structure				
8a Title	The report has an informative title.	1	1	The candidate has included an informative title.

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8b Structure	A clear and concise report.	1	1	The candidate's report is clear and concise.
Total		20	15	