Mass of ruler investigation

The aim of this investigation is to determine the mass of the ruler by finding a set of balancing points with an extra mass and a single pivot and making use of a graphical method to obtain the results from the data. The focus of the assessment is your choice of balancing mass, your working of the uncertainties, and the conclusion and evaluation of your experiment (see assessment criteria at the end).

# Choice of Mass

## State your choice of mass to balance the weight of the ruler.

## Explain your choice of mass. Why choosing this mass is better for your experiment?

# Uncertainties

## Describe the origin of the uncertainties involved in the measurements

## Describe your quantification of the uncertainties, state their value and explain how you come up with those values.

## Include your processed data table with clear headings and uncertainties

# Final Graph

## Plot your final graph. Make sure to include: Title, Axis Labels, error bars, lines of best fit, equations of best fit,…

## From the graph and the equations of best fit, determine the mass of the ruler with its uncertainty (show your work).

## Measure the mass of the ruler you used with an electronic balance. Compare its value with the value above.

## Write the evaluation for this experiment following this website as a guide: <https://sites.google.com/site/mrburchsclasses/Home/ib-physics-1/internal-assessment/evaluation---ia>

# Assessment criteria

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| **Maximum: 36 marks** |
| **Mark** | **Descriptor** |
| 0 | The student’s report does not reach a standard described by the descriptors below.  |
| 1-2 | The report shows evidence of little consideration of the impact of measurement uncertainty on the analysis. The processed data is incorrectly or insufficiently interpreted so that the conclusion is invalid or very incomplete. A conclusion is **outlined** which is not relevant to the research question or is not supported by the data presented. The conclusion makes superficial comparison to the accepted scientific context. Strengths and weaknesses of the investigation, such as limitations of the data and sources of error, are **outlined** but are restricted to an **account** of the **practical** or **procedural issues** faced. The student has **outlined** very few realistic and relevant suggestions for the improvement and extension of the investigation. |
| 3-4 | The report shows evidence of some consideration of the impact of measurement uncertainty on the analysis. The processed data is interpreted so that a broadly valid but incomplete or limited conclusion to the re-search question can be deduced.A conclusion is **described** which is relevant to the research question and is supported by the data presented. A conclusion is described makes some relevant comparison to the accepted scientific context.Strengths and weaknesses of the investigation, such as limitations of the data and sources of error, are **described** and provide evidenceof some awareness of the **methodological issues** involved in establishing the conclusion.The student has **described** some realistic and relevant suggestions for the improvement and extension of the investigation. |
| 5-6 | The report shows evidence of full and appropriate consideration of the impact of measurement uncertainty on the analysis. The processed data is correctly interpreted so that a completely valid and detailed conclusion to the research question can be deduced.A conclusion is **described and justified** which is relevant to the research question and is supported by the data presented. A conclusion is correctly **described and justified** through relevant comparison to the accepted scientific context.Strengths and weaknesses of the investigation, such as limitations of the data and sources of error, are **discussed** and provide evidenceof a clear understanding of the **methodological issues** involved in establishing the conclusion.The student has **discussed** realistic and relevant suggestions for the improvement and extension of the investigation. |