

**Physics lesson –  
Writing practical investigation reports**  
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**A general outline in report writing for practical investigation**

(1) *Outline of the investigation:* A brief description of the objectives, stating the nature, scope and extent of the investigation.

**Example**

To use the basic equipment in a high school physics laboratory to investigate the bending of a wooden beam (specify the type of wood used) of uniform cross-section, in particular the relationship between bending (amount of deflection) and the thickness of the beam, keeping the length of the beam and the applied force constant.

For practical reasons the thickness of the beam varies between 0.5 to 2 cm approximately.

(2) *Physics theory:* Any known theory associated with the investigation leading to the variables to be investigated.

(3) *Planning for the investigation:* Availability of equipment and suitable materials. Prepare the materials for investigation.

**Example**

Check with teacher the equipment needed. Wooden beams of the required range of thickness may not be available commercially. The school woodwork department would be helpful to prepare them.

(4) *Diagram of the setup:* Labelled diagram showing the apparatus used. A clear diagram often conveys ideas better than writing.

(5) *Procedure:* Besides a set of clear and concise steps, this will include difficulties encountered and how to overcome them, and how to take measurements safely, accurately and systematically.

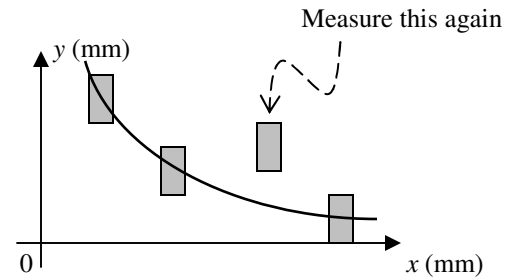
(6) *Recording results:* These are the measurements taken in the investigation. Present them in the order in which they were taken. Unusual readings should be mentioned and rechecked.


**Example** Tabulate measurements of thickness and deflection. Independent variable on the left, dependent variable on the right. Include uncertainties in the headings if they are the same for a quantity, otherwise write next to each measurement.

<b>Thickness <math>x</math> (mm) <math>\pm 0.2</math> mm</b>	<b>Deflection <math>y</math> (mm) <math>\pm 0.5</math> mm</b>
5.2	12.2

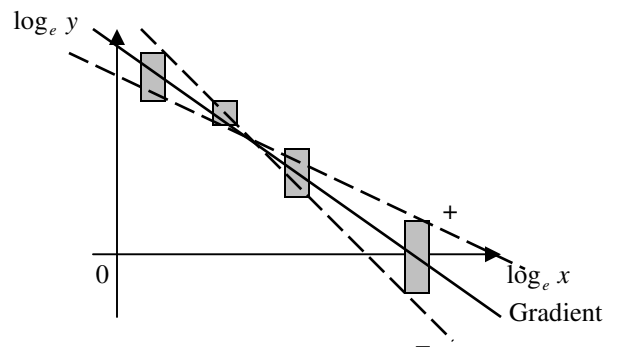
(7) *Analysis of results:* This section contains tables of calculated values (if necessary) from the recorded measurements and/or graphs to determine relationships between variables. Any gradients and/or intercepts worked out are given. Discuss what the graphs show. Explain how this information leads to the final conclusions.

**Example**



When one reading has an uncertainty, use an error bar to indicate it. When both readings have uncertainties, use an error box .

$\log_e x$	$\log_e y$
$1.65 \pm 0.04$	$2.50 \pm 0.04$
$\pm$	$\pm$
$\pm$	$\pm$
$\pm$	$\pm$



(8) *Discussion of uncertainties:* Explain the sources of uncertainties and how to obtain the recorded uncertainties in measured quantities, and how to determine uncertainties in calculated quantities. Consult other itute physics lessons.

(9) *Ideas and suggestions:* Give ideas about changing the apparatus, making it easier and more accurate to conduct the investigation. Suggest further experiments which might be done with the apparatus or with slight modifications.

(10) *Conclusion:* A concise summary of your findings, including (i) numerical results and/or relationships with uncertainties; (ii) any disagreement outside the margin of errors between your conclusions and that from theory.