**Investigating Ramps**

**TASK: To develop and run an investigation that tests the effects of ONE of the following variables (Ramp Length, Ramp Height, Ramp Angle or Trolley Mass) on the amount of force required to move a small trolley up the ramp.**

**You will be supplied with the following equipment as well as a marking rubric.**

* Trolley
* Spring balances
* Books
* Wooden ramp
* Protractor

You will be required to write a report (similar to the Heart Rate investigation). This report will be written in class under the guidance of your teacher. It will not be assessed.

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| **Marking key – Forces** | |
| **Description** | Marks |
| Planning | |
| Title   * Title accurately reflects the investigation * Title somewhat reflects the investigation * No title or title does not reflect the investigation | 2  1  0 |
| Aim   * Aim accurately reflects investigation, stating both independent and dependent variables * Aim somewhat reflects the investigation, stating one of the variables * No aim or aim does not reflect the purpose of the investigation | 2  1  0 |
| Hypothesis   * Hypothesis is written as statement, and links the independent and dependent variables * Hypothesis is either not written as statement or does not link the independent and dependent variables * No hypothesis or hypothesis does not include either variable | 2  1  0 |
| Variables   * Identifies independent, dependent and at least 2 controlled variables * Identifies three out of independent, dependent and at least 2 controlled variables * Identifies two out of independent, dependent and at least 2 controlled variables * Identifies one out of independent, dependent and at least 2 controlled variables * Does not include variables | 4  3  2  1  0 |
| Equipment list   * List of equipment included * No list of equipment included | 1  0 |
| Method   * Method written in a lot detail and very easy to follow * Method written in some detail and easy to follow * Method written in limited detail or hard to follow * No method included | 3  2  1  0 |

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| **Description** | Marks |
| Displaying and Analysing Results | |
| Results Table   * Results table neatly and clearly presented with headings and units * Results table included, but messy, unclear or missing headings or units * No results table included | 2  1  0 |
| Graph - Title   * Graph includes title, x-axis correctly labelled including units, y-axis correctly labelled including units, data plotted accurately, lines of best fit and a key * 5 out of those listed above * 4 out of those listed above * 3 out of those listed above * 2 out of those listed above * 1 out of those listed above * No graph included | 6  5  4  3  2  1  0 |
| Discussion - Hypothesis   * States whether hypothesis was supported using quantitative evidence from results * States whether hypothesis was supported using qualitative evidence from results * States whether hypothesis was supported, but no evidence * Does not refer back to hypothesis | 3  2  1  0 |
| Discussion - Errors   * Discusses one source of error in a lot of detail and describes how it affected the results * Discusses one source of error in some detail and states how it affected the results * Discusses one source of error in limited detail * Does not discuss sources of error | 3  2  1  0 |
| Discussion – Improvements   * Discusses one improvement in a lot of detail and describes how it improves the reliability of the experiment * Discusses one improvement in some detail and states how it improves the reliability of the experiment * Discusses one improvement in limited detail * Does not discuss improvements | 3  2  1  0 |
| Conclusion   * Detailed summary of experiment findings * Brief summary of experiment findings * Does not include conclusion | 2  1  0 |
| Subtotal | /19 |
| Total | **/33** |