**Investigate two factors that affect the distance taken for a toy car to stop after rolling down a ramp.**

**This was the marking scheme for a previous investigation**

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|  |  |  | **Guide to mark assignment** |  |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Section** |  |  |  |  | | **Aims** | Total Mark | Investigate two factors that affect the distance taken for a toy car to stop after rolling down a ramp. | H.L. |
| **Introduction** | Clear statement of the problem/topic to be investigated, background research undertaken in preparation for the investigation: people, books, websites, etc. as sources of relevant information. | 5 | **Statement / identification of problem / topic to be investigated:**  **Research:** Any reference to book / internet (web) / person consulted etc. | (3)  (2) |
| **Preparation and planning** | Identification of variables and controls as required  List of equipment needed for the investigation  List of tasks to be carried out during the investigation | 20 | **Variables / Controls:**  Identify ***five***variables, the **two essential** variables and any **three other** variables, and/or indicate how some of these need to be controlled or held fixed:  Possible Variables:   * Distance travelled before stopping * Elevation (vertical height) (slope) (angle) of ramp * Surface(s) on which the toy car rolls after the ramps * Length of ramp * Same ramp * Starting position on ramp * Toy car (i.e. use same one or identical ones) * friction * K.E. (velocity) of car leaving ramp * Mass of toy car * Shape of car (air resistance)   **Equipment needed:**  Identify any ***five***pieces of equipment used:   * Toy car(s) * Ramp * Balance * Oil * Meter stick (tape measure) * Retorts (or other mechanism to elevate ramp) * Different rolling surfaces * Any valid piece of equipment pertinent to procedure   **List of tasks:**  Identify any ***four***tasks carried out in investigation:   * Procure toy car * Set up ramp * Set (vary) factor 1 * Set (vary) factor 2 * Clean rolling surface of anything that might interfere with result (dirt or grit) * Release car * Measure distance travelled * Record data * Graph (if present) | (3 + 3)  (1 + 1 + 2)  (1 + 1 + 1 + 1 + 1)  (1 + 1 + 1 + 2) |
| **Procedure** | Procedure, apparatus, safety, data collection/observations   * Safety precautions required for this investigation * Procedures followed in the investigation * Recorded data/observations | 20 | **Safety**: Identify any ***two* specific** safety precaution followed in conducting the investigation  **Procedure**: **State or Show**  Identify any ***five***steps taken in conducting investigation:   * Set up ramp * Vary heights (angles) (surfaces) (length of ramp) (starting position on ramp) (mass of car) (air resistance) * Clean rolling surface of anything that might interfere with result (dirt or grit) * Release car from fixed point on ramp * Measure distance travelled * Repeat to verify * Repeat for factor 2 * Record data * Graph (present)   **Recorded Data / Observations:** Identify any ***two***points related to method used:  **Factor 1** *versus* **distance** travelled  **Factor 2** *versus* **distance** travelled  [Table presentation likely] | (2 + 3)  (1 + 1 + 2 + 3 + 3)  (2)  (3) |
| **Analysis &**  **Conclusions** | Analysis   * Calculations/data analysis * Conclusion(s) and evaluation of results(s) | 20 | **Calculations / Data analysis:**  ***One***relevant comment analysing data **or** calculation or graph  Limited manipulation of data  **OR**  Good manipulation of data  **OR**  Excellent manipulation of data  **Conclusion**:  ***One***relevant conclusion drawn **or** evaluation of results obtained  Limited treatment  **OR**  Good treatment  **OR**  Excellent treatment | (4)  (7)  (10)  (4)  (7)  (10) |
| **Comment** | Comments (e.g. refinements, extensions, sources of error etc.) | 10 | ***Two***comment on **refinement** / **extension** / **source of error**  reliability of data / how process could be improved / sources of error /  possible reason for unexpected result /  possible extension of the investigation  Limited comprehension  **OR**  Good comprehension  **OR**  Excellent comprehension | (1 + 1)  (3 + 3)  (5 + 5) |
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