**VCE Physics**

Unit 2 Outcome 1

SAC Mark: \_\_\_\_\_\_\_/14

Time Allocation: 50 minutes

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**SAC 2.1 Mousetrap car investigation**

I \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ declare that the following School-Assessed Coursework (SAC) is my own work and that I have not used work from any other source without proper acknowledgement.

If you have a tutor who has assisted you in this subject, please tick the below box. VCAA requires that you *must* acknowledge if you have a tutor assisting in a subject.

* I acknowledge that I have had a tutor and have discussed the work done with them.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

{Student Signature} {Date}

*VCAA advises that the grade for SACs can change due to moderation.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Rubric** | **1** | **2** | **3** | **4** |
| **makes observations** | records observations | reasons for observations | explains how observations can be explained by theories |  |
| **reports results** | lists results of variables | identifies how different variable are connected | explains how variables are connected |  |
| **modifies method** | identifies modifications | explains how modifications improve design | justifies effect of modifications using theory | explains how modifications improve quality of data e.g. accuracy and precision |
| **makes conclusions** | summarises key findings | identifies limitations of key findings | makes recommendations which overcome the limitations | discusses implications of key findings  *“How do your findings affect the design of cars?”* |

**Mousetrap Car Design Justification**

|  |  |  |
| --- | --- | --- |
| **Concept – respond to any 4 THAT YOU HAVE CHANGED** | Predicted effect of ONE modification on the measurement, **justify with theory** | **Observations**  **Explain** your observations of the effect of the modification |
| **Mechanical Advantage**    **Base car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_**  **Mod car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_** | One Modification that affects this measurement:  Justification of modification: | Observation of the experimental effects of the modification: |
| **Pulling Distance (m)**    **Base car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_**  **Mod car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_** | One Modification that affects this measurement:  Justification of modification: | Observation of theoretical vs experimental testing of pulling distance:  Observation of the experimental effects of modification: |
| **Total distance (m)**    **Base car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_**  **Mod car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_** | One Modification that affects this measurement:  Justification of modification: | Observation of theoretical vs experimental testing of total distance:  Observation of the experimental effects of modification: |
| **Static coefficient of friction**    **Base car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_**  **Mod car value:**    **\_\_\_\_\_\_\_\_\_\_\_\_** | One Modification that affects this measurement:  Justification of modification: | Observation of the experimental effects of modification: |
| **Kinetic coefficient of friction**    **Base car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_**  **Mod car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_** | One Modification that affects this measurement:  Justification of modification: | Observation of the experimental effects of modification: |
| **Spring Constant**    **Base car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_**  **Mod car value:**  **\_\_\_\_\_\_\_\_\_\_\_\_** | One Modification that affects this measurement:  Justification of modification: | Observation of the experimental effects of modification: |

|  |  |
| --- | --- |
| **Reports Results** |  |
| 1. Identify links between mechanical advantage, pulling distance and total distance |  |
| 1. Summarise the trends observed for the coefficient of static and kinetic friction and the spring constant |  |

|  |
| --- |
| **Makes conclusions** |
| Summarise the key finding from your modifications:  Identify a limitation of your design for real world applications:  Make a recommendation to overcome this limitation:  What are the implications of the key finding on how to design or maintain machines that have energy transfers similar to the mousetrap cars? |