**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.

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 {Student Signature} {Date}

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

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| **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**

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| **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: |

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| **Reports Results** |   |
|  1. Identify links between mechanical advantage, pulling distance and total distance

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|  1. Summarise the trends observed for the coefficient of static and kinetic friction and the spring constant

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| **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?         |