



Mission Heights

GROWING GREATNESS
KIA MANA AKE



Science and Maths assessments

Due date: 28th June, 2024 at 3.30pm

Task:

As part of your 'Forces and Motion' context we have conducted some experiments, identifying and calculating forces, using the distance, time and speed formula. You have also looked at Newton's 3 laws. We will be doing a collaborative assessment for Science and Maths. You will be conducting the experiment during science lessons in the first week and the following week you will do your write-up as well as your graph (in Maths)

Instructions:

Science: Done in 2 parts. Highlighted in **red** is **group** work you will do to conduct the experiment and obtain results. In **blue**, you will need to do this **individually**.

Maths: The straight line graph and its analysis will be assessed under Maths.

Rubric:

Criteria	WORKING TOWARDS Curriculum expectation	Working AT curriculum expectation	Working ABOVE curriculum expectations	Working BEYOND curriculum expectation
Investigation	You have gathered and processed data.	You have gathered appropriate data. You have interpreted the data, drawing simple conclusions.	You have interpreted the data and drawn science based conclusions based on the data.	You have interpreted the data and drawn science based conclusions linked to the data.
Speed (velocity)	You have described speed in terms of distance and time	You have described and calculated overall speed of various objects	You have described, accurately calculated and illustrated the speed using graphs	You have investigated, coherently explained the speed of an object, and accurately calculated and illustrated speed using graphs
Data display	You have attempted to pose a question and chosen some appropriate graphs to organise and display data	You have posed a question and chosen graphs to organise and display data	You have posed a correct question and presented your data using appropriate graphs	You have posed a correct question and presented your data using appropriate graphs and clearly shown the tables and calculations where applicable
Data analysis	You have attempted to describe and analyse some part of a given data display	You have described most part of a given data display	You have analysed the data and graph in context by commenting on the features of the graph	You have clearly analysed the comparison in context by commenting on the features of the graph and answered your question with justification.
Writing Accuracy	You have made errors in grammar, spelling and/or	You have made some errors, but minimal reader	You have carefully edited your writing to ensure you	You have carefully edited your writing to ensure you

	punctuation and these are intrusive at times, consequently the reader has to infer meaning	inference is needed as meaning is mostly clear	have few intrusive errors and meaning is consistently clear	have no intrusive errors and meaning is consistently clear
Time Management	You have not handed in any work	You have handed your work in late	You have handed your work in on time	You have handed your work in on time

Maths Part

For the Math part of the assessment you will be graded on the following.

Part A

1. Plotting a graph with appropriate labels, scale, title etc
2. Analysing the correlation between the variables.

Part B

1. Solve some contextual physics problems that involve algebra.

Science Assessment Task

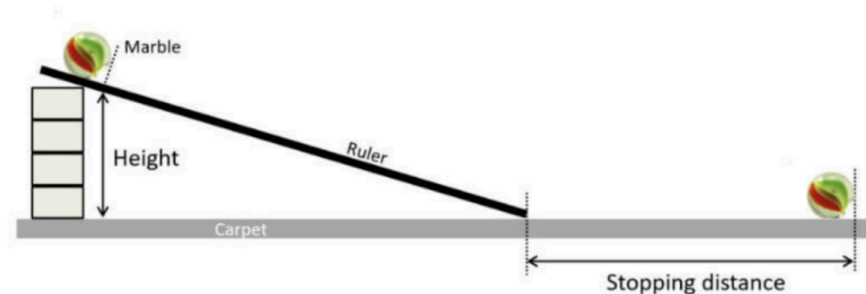
	Fill in the boxes below as you carry out your investigation. Sections highlighted in red are to be completed AS A GROUP . Sections highlighted in blue are to be completed BY YOURSELF .
Aim: (Group)	
Hypothesis: (Group)	
Variables: (Group)	Independent variable - What are we changing? <ul style="list-style-type: none">• Dependent variable - What are we measuring? <ul style="list-style-type: none">• Control variables: What factors do we need to keep the same as we carry out the experiment? List them below <ul style="list-style-type: none">•
Equipment and Method: (This is done for you already)	Equipment: <ul style="list-style-type: none">• Ramp• Toy car• Meter ruler• Digital timer

- Wooden blocks
- Tape measure

Method for carrying out the experiment:

Method:

1. Set up the equipment as shown in the diagram.
2. Place the toy car at a desired release height of 2 blocks.
3. Release the car down the ramp.
4. Allow the car to come to a complete stop.
5. Measure from the end of the ramp/ruler to the front of the car.
6. Repeat this process three more times and record the data each time.
7. Repeat steps 2–6 with the following release heights: 3 blocks, 4 blocks and 5 blocks.
Use your distance measurements and timings to calculate the speed at each of the heights



Results
(Group)

(Maths portion)

1. Insert your results below (assessed in Maths)

2. Describe your results

Analysis (Individual)	
Conclusion (Individual)	<p>Use the following prompts to guide you:</p> <p>What does the line show <i>As the height of the ramp increases, the average distance travelled by the car also increases. This tells us there is a relationship between the two variables.</i></p> <p>Give an example <i>You can see that at ramp height of 69.8 cm the car went 69.8 cm in distance compared to when the ramp was 82.3 cm high and the car travelled 82.3 cm.</i></p> <p>Use the equation <i>If the ramp height is 81 cm high --> sub that number into your equation for "x" ... $y = 1.01 \cdot x + 0.846$ --> $y = 1.01 \cdot 81 + 0.846 = 76.596$ cm</i></p> <p>Explain the equation <i>If the ramp was 81 cm high then the car should travel 76.596 cm from it.</i></p>
Discussion (Individual)	<p>Describe the toy car ramp experiment in physics terms.</p> <p>What are the forces acting on the car at rest and when moving ?</p> <p>Identify Newton's 1st and 2nd laws and which portion of the experiment this is observed in.</p> <p>KEYWORDS: forces, balanced and unbalanced forces, contact and non-contact forces, distance, time, speed, aerodynamics, friction, Newton's 1st, 2nd and 3rd Laws.</p>