

## JUNIOR ASSESSMENT Task – Stage 5

<b>Faculty: iSTEM</b>	<b>YEAR 9</b>	<b>Topic: Fundamentals of iSTEM</b>
<b>Task Description:</b> This assessment will be a design thinking challenge to plan, build and test a mechanical device to assess your understanding of the fundamentals of the STEM. <b>This will involve a prototype test phase task that will be conducted in class.</b>		
<b>Outcomes Assessed:</b> A student; 5.1.1 develops ideas and explores solutions to STEM based problems 5.2.1 describe how scientific and mechanical concepts relate to technological and engineering practice 5.2.2 applies cognitive processes to address real world STEM based problems in a variety of contexts		
<b>Weighting(s): 50%</b>		
<b>Date Given: 17<sup>th</sup> March</b>	<b>Date of Completion: 3<sup>rd</sup> April</b>	
<b><u>Task Guidelines:</u> (steps/marking scale/grid)</b> <b>You will be expected to: Complete a design thinking challenge that will include detailed designs of a toy car launcher, an explanation of how the design will work based on an understanding of simple machines and analysis of the data collected from the in-class launch test.</b>		
<b>Penalties:</b> Failure to complete the task with a sustained and diligent effort or because you are absent may lead to: <ul style="list-style-type: none"><li>• A zero mark.</li><li>• the issuing of a warning letter explaining that you have not met the course learning outcomes according to the requirements of the NSW Board of Studies.</li></ul>		
<b>Please Note:</b> that plagiarism, the using of the work of others without acknowledgement, will incur serious penalties and may result in zero awards. Any cheating will also incur penalties.		

## Individual Design and Programming Task

### Task Description:

Design and build a device that will launch a hot wheel's racer a distance of 3m and pass through 3 different goals. You will build a working launcher model that is free standing (no assistance to hold upright), can hold the car and attach to the launch track. This device will then be tested during class, where it will have to launch and pass through each goal, set at different angles and different distances. Planning and research must be included as well as a reflection on the success of the final launcher design.

### Marking Criteria:

The following tasks will be assessed as shown in the following marking criteria



## **IDEATE**

**Sketch or plan a design for your hot wheel launching device. Design could include; photo of track with design notes for changes to design or a sketch with labels.**

## **PROTOTYPE**

**Include a photo of your ACTUAL device:**



**How successful were the changes you made to your catapult's accuracy and ability to travel through the various goals?**

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**Goal 1**

<b>Trial</b>	<b>Total distance travelled (cm)</b>	<b>Distance from goal (cm)</b>	<b>Observations and comments</b>
<b>1</b>			
<b>2</b>			
<b>3</b>			

**Goal 2**

<b>Trial</b>	<b>Total distance travelled (cm)</b>	<b>Distance from goal (cm)</b>	<b>Observations and comments</b>
<b>1</b>			
<b>2</b>			
<b>3</b>			

### Goal 3

Trial	Total distance travelled (cm)	Distance from goal (cm)	Observations and comments
1			
2			
3			

# Practical Investigation Marking Scheme.

Name: \_\_\_\_\_

	Extensive understanding of <b>A</b>	thorough knowledge of <b>B</b>	Sound knowledge of <b>C</b>	Basic knowledge of <b>D</b>	Elementary knowledge of <b>E</b>	
Design created/ researched	<b>design is comprehensive, well thought out, researched and well presented</b>	<b>design is thorough, well thought out or researched and well presented</b>	<b>design is clearly thought out or researched and well presented</b>	<b>design is basic, not original or researched</b>	<b>design is very limited, not thought out or researched, presented to a basic level</b>	
	5	4	3	2	1	0
Design functionality	<b>design is functional or in concept functional. Comprehensively fits the design brief, free standing, hold and fires projectile</b>	<b>design works or in concept is functional. Thoroughly fits the design brief, mostly free standing, hold and fires projectile</b>	<b>design works mostly or in concept should work. Fits the design brief generally, free standing, hold and fires projectile</b>	<b>design works at a basic level or in concept is functional to a basic level. Fits the design brief, in some aspects, not all.</b>	<b>design is limited or elementary. Fits the design brief in one or two aspects</b>	
	5	4	3	2	1	0
problems and solutions encountered are identified.	<b>Improvement to the catapult design are identified and an exceptional understanding of the solutions are articulated</b>	<b>Improvement to the catapult design are identified and a thorough understanding of the solutions are articulated</b>	<b>Improvement to the catapult design are identified and some solutions are articulated</b>	<b>Some problems with the design are identified or solutions offered but don't correct the problem</b>	<b>Some problems are identified</b>	
	6	5	3	2	1	0
Demonstrated a deep understanding of the scientific and mechanical concepts used in the model	<b>student demonstrates exceptional understanding of the scientific and mechanical concepts.</b>	<b>student demonstrates a thorough understanding of the scientific and mechanical concepts.</b>	<b>student demonstrates a sound understanding of the scientific or mechanical concepts.</b>	<b>student lists some relevant scientific or mechanical concepts.</b>	<b>student lists some scientific or mechanical concepts.</b>	
	4	3	2	2	1	0
<b><u>Catapult construction</u></b>	<b><u>works well</u></b>	<b><u>almost great</u></b>	<b><u>started out well</u></b>	<b><u>sort of worked</u></b>	<b><u>Oh dear</u></b>	
free standing		<b>stands completely unaided – innovative design</b>	<b>stands completely unaided</b>	<b>stands mostly unaided</b>	<b>stands only with support</b>	
launches projectile			<b>projectile launched with each test</b>	<b>projectile launched with most tests</b>	<b>projectile fails to launch</b>	
device attaches to track		<b>Device attaches to track – innovative design</b>	<b>Device attaches to track</b>	<b>Device mostly attaches to track</b>	<b>Device held against track</b>	
consistency of aim	<b>each test resting within 15cm range of each other</b>	<b>most tests resting within 20cm range of each other</b>	<b>most tests resting within 30cm range of each other</b>	<b>some tests resting within 30 – 50cm range of each other</b>	<b>tests resting outside of 50cm range of each other</b>	
accuracy of aim	<b>closest test resting within 5cm range of goal</b>	<b>closest test resting within 10cm range of goal</b>	<b>closest test resting within 15cm range of goal</b>	<b>closest test resting within 30- 50cm range of goal</b>	<b>closest test resting outside of 50cm range of goal</b>	
	5 each	4 each	3 each	2 each	1 each	0

**Total** \_\_\_\_\_

Overall Comments: \_\_\_\_\_

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