YEAR 11 2AB PHYSICS 2011 MOVEMENT RESEARCH PROJECT

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The Y11 physics movement research project requires you or your group to select a topic related to **Movement** as outlined in the Year 11 2AB physics program and conduct an experiment.

This research project involves using the physics of movement to create an experiment. Objects such as: Parachutes, Hovercrafts, Yachts, Ships, Ice, Catapults, Skates and Ramps, shUttles, baLls, RockEts & Scooters can be used in the research project.

43%	Each research group must:	~ 53
	1 Design a movement experiment	
, // (E)	2 State a hypothesis	
-\\\ -\\\	3 Conduct a movement experiment and collect data	
,	4 Derive a predictive formula	CEVIT
<u> </u>	5 Analyse the data to test the hypothesis.	

The assessment information is given below:

Sequence	•	Marks	Date	Term	Week
Step 1	Handout marking Guide		24.03	T1	4
Step 2	Project outline due date	10	15-04	T1	ø
Step 3	Project written report due date	40	17.06	T2	7
Step 4	Project oral presentation (starts)	50	17.06	T2	7

The wisdom of experience should not be ignored! So read on.

- 1. It is strongly suggested that you do not wait till the last minute to conduct your experiment. Time is crucial and you will need this time to complete a good scientific written report and a well prepared oral presentation.
- 2. Previous Y11 students have concluded that it is best to perform an early trial run of the experiment to ensure that: 1) you can conduct the experiment successfully, and

2) you can obtain satisfactory results that can be graphed.

3. It is preferred that students conduct the research projects in pairs or by themselves!

If you are unable to conduct & achieve a satisfactory result for your experiment you must:

a) See your physics teacher to discuss the issue/s. Suggested changes may lead to an improved result. If a successful outcome is not imminent then a topic change may be required.

b) If a research topic change is required (after the teacher discussion) the last date to effect a change is:

T1 we

T1 week 11 Fri 22-April

- 5. If the project topic is changed (with approval from your teacher) you do not have to submit a new project outline. Marks allocated for your original project outline stand. It would then be best to conduct trials immediately.
- 6. Marks are allocated for original and relevant projects.
- 7. The report is to be stapled in the top left hand corner (not in plastic sleeves or presentation folders).
- 8. Some of the equipment required for the project may be borrowed from the laboratory technicians in the science learning area. Ask politely when requesting equipment and you must sign for it and you are responsible for the equipment!

T	HE RESEARCH PROJECT: WRITTEN OUTLINE	
Th	e project outline is worth 10 marks. This report outline should be between 1	to 2 pages in
ler	gth (font 12). The report outline should include:	
1	An experiment statement of the aim(s) and hypothesis	2 marks
2	A list of materials and equipment (NB: use dot points)	2 marks
3	An outline of your experimental method/procedure which shall include diagrams or sketches (NB: use numbered points)	4 marks
4	A possible results graph for your data with an explanation of what you expect the trend to be	2 marks

THE RESEARCH PROJECT: WRITTEN REPORT

The project written report is the scientific document of what was decided, what was done, what aspects were changed, what did not work, what the results are and the discussion. The mark allocated for the research project written report is 40 marks. The following are the basic steps:

- 1. Design the investigation, set up the experiment, conduct some trials and make observations. Redesign the experiment if necessary, and conduct the final investigation.
- 2. Analyse the data, generate a predictive formula and write a report using the assessment guide.

The following sections are the most significant

<u>Presentation</u>: This report must be printed on A4 paper with a font of 12. Printing the report in colour is not required. Marks will be deducted for poor presentation.

Method: This is a process where a documented experimental procedure can be repeated to obtain a similar result. Each step in the method should be numbered. The experimental method should be clear and refer to diagrams, sketches or photographs. If any apparatus is built or made, the method of construction should not be included in the experimental method (ie. Separate into parts A & B).

The experimental method which was included in your outline will be similar, but different, to your final experimental method. The final procedure must include diagrams or sketches.

If you have completed your method ask yourself this question "Could another student from a different group complete the experiment by following your method?" If the answer is no, then you will need to modify your method.

Results: The results that you obtain must be collated and graphed. From these results a predictive formula must be derived.

<u>Discussion</u>: The results must be interpreted. Trends or lack of any trends must be identified and explained. The predictive formula should be discussed. The predictive formula should also be tested.

The marking outline is attached to this document. The following tips and checklist are aimed to help you score highly on your report.

And Annia de response and a regular reasonable response and assess as a second of the regular **PLEASE NOTE:**

Do not leave it to the last weekend to complete the experiment. Making up data to suit the experiment may result in a <u>significantly</u> reduced mark!

Things will go wrong and time will be needed to rectify and repeat the experiments. Sufficient time has been allocated for the completion of this major assessment.

The report will be assessed according to the attached marking key. The report must use the following mandatory headings in your report.



Research report

ASSESSMENT GUIDE



MANDATORY HEADINGS	KEY POINTS # a highlight implies an important feature!	SCORE /40	CHECK LIST
	Include a title page and a table of contents	<u> </u>	
ABSTRACT (~ ¼ page max.)	A summary must include: the aim, the general experimental method, and key findings.	(3)	
INTRODUCTION (~ ½ - ¾ page max.)	 Select an original and relevant physics topic for your project. Overall degree of difficulty Explanation of the background and goals of the project 	(2) (2) (1)	
AIM(S)	Propose an aim for the investigation. eg Aim: To find the relationship between mass and distance travelled by a bike rolling down a hill.	(1)	
HYPOTHESIS	The hypothesis is a statement that normally includes an 'if' and 'then' statement about a physical action. It proposes an answer to conditional change. Eg. If the tyre pressure of a push bike is reduced then the friction from the tyre will increase. Eg. The bike with the largest mass will travel the greatest distance.	(1)	
TABLE OF VARIABLES	 Controlled (What conditions are the same?) Uncontrolled (What conditions are changing?) Independent (What variables are you changing?) Dependent (What variables are you measuring?) 	(2)	
MATERIALS	 Locate resources and references. List the equipment and material you require for the investigation (use dot points). Do you need to make or obtain any special 	(1)	
METHOD	 Is your method the most appropriate one? Does the method refer to sketches/photographs? Conduct a suitable number of trials. Develop a predictive formula for your experiment? Test the predictive ability of your formula? 	(4)	

RESULTS	Record the results accurately in an appropriate format.	(2)	
	 Averages of these results should be shown. Show how any predictive formulae is derived and state the domain or range of values for which it has a high predictive capability. Give some numerical value as to the validity of your formula ie, how far out are your theoretical values with respect to known values? 	(3)	
DISCUSSION	Your results need to be analysed ie, What was the trend if any? Was your result what you expected? Can you account for any values or trend which did	(6)	
CONCLUSIONS	not conform to your hypothesis or model?		
CONCLUSIONS	State your conclusion(s) clearly. Relate the conclusion to the aim, and	(1)	
	State your evidence which supports your conclusion.	(3)	
REVIEW	 State any problems that arose and what action was taken. Record how the investigation may be changed and improved if repeated. 	(4)	
REFERENCES	You must reference any books, software and/or internet sites used according to the bibliography rules available in the WSHS library.	(2)	
ACKNOWLEDGE MENTS	Acknowledge any people who have helped or assisted with the research project.	(1)	
SPELLING,	A total of three marks will be taken off in the event of	MINUS	
GRAMMAR AND PRESENTATION	excessive poor spelling, grammar or presentation.	(1-3)	
		Total (40)	-

