

Tabled 11.52 am EIC  
20/3/13

# Extended Experimental Investigation

## Term 4

**SET:** 8 October

**DUE:** 9 November

**TASK:** Investigate how the Laws of Physics apply to a particular toy, game or sport.

The investigation will consist of:

- a review of relevant scientific literature (if necessary)
- a simple experiment that explores a physical concept linked to a game or sport
- further experimentation that more closely models an application of physics concepts. (This may be a development of the simple experiment or an entirely new experiment.)
- writing a report on your findings (Introduction and Discussion no more than 1000 words)

### SUGGESTIONS:

Students could investigate the physical principles governing one of the following:

- Playground equipment (eg. swings, see-saws)
- Billiards
- Design of sporting equipment:
  - Shoes
  - Racquets
  - Balls
- Projectile motion of balls
- Construction of a simple telescope
- Chromatic aberration
- Refractive index of different materials

Other relevant investigations may be pursued subject to discussion with the teacher.

### TIMELINE

Week 1:	Risk assessment/First phase of experimentation
Week 2:	Second phase of experimentation
Week 3:	Submit draft
Week 4:	Conferencing
Monday 5 November:	Submit Introduction/Analysis to TurnItIn
Thursday 8 November:	Submit final edition

Knowledge and Conceptual Understanding	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
	Complex and challenging concepts and theories have been reproduced and interpreted	Complex or challenging concepts and theories have been reproduced and interpreted	Concepts and theories have been reproduced	Simple ideas and concepts have been reproduced	Isolated fuel and combustion facts have been reproduced
	Complex observed phenomena have been explained by comparing them to theoretical predictions	Observed phenomena have been explained by comparing them to theoretical predictions	Simple observed or expected phenomena have been explained	Simple observed or expected phenomena have been described	Simple isolated phenomena have been recognised
	Algorithms and concepts have been linked and applied in complex and challenging situations	Algorithms and concepts have been linked and applied in complex or challenging situation	Algorithms have been applied in simple situations	Algorithms have been applied	Simple given algorithms have been applied
Investigative Processes	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
	A significant, justified question or hypothesis has been formulated The experimental design is efficient, effective and has been refined by the student	A justified question or hypothesis has been formulated An experiment has been designed in response to the question/hypothesis	A question or hypothesis has been formulated A suitable standard investigation has been selected	A given investigation has been implemented	Given procedures have been used with guidance
	Risks to safety have been assessed and the investigation has been managed. Technology has been appropriately selected, applied and adapted to gather, record and process valid data	Risks to safety have been assessed and the investigation has been managed. Technology has been appropriately selected and applied to gather, record and process data	Risks to safety have been assessed and the investigation has been managed. Technology has been appropriately selected and applied to gather and record data	Equipment and technology have been safely used. Technology has been used to gather and record data	Safe procedures have been followed under supervision. Equipment has been used to gather data
	Data has been systematically analysed to identify relationships between patterns, trends, errors and anomalies	Data has been analysed to identify patterns and trends. Data has been analysed to identify errors and anomalies	Data has been analysed to identify obvious patterns and trends. Data has been analysed to identify obvious errors and anomalies	Obvious patterns in the data have been identified. Obvious errors in the data have been identified	Data has been recorded
Evaluating and Concluding	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
	Complex relationships between variables have been analysed	Complex relationships between variables have been analysed	Relationships between variables have been described	Simple relationships between variables have been identified	Obvious relationships between variables have been identified
	Extensions or adaptations of the investigation have been explored. The conclusion has been justified	Extensions or adaptations of the investigation have been explained. The conclusion has been discussed	Extensions or adaptations of the investigation have been described. A conclusion has been stated	Improvements or possible outcomes of the investigation have been identified	A statement has been made about the outcome of the investigation
	Data and ideas have been selected with discrimination to make meaning clear. A range of tables and graphs have been used innovatively.	Data and ideas have been selected to make meaning clear. A range of tables and graphs have been used.	Data and ideas have been selected to convey meaning. A range of formats have been used.	Data or ideas have been presented in a range of formats	Scientific data or ideas have been presented