Scientific Investigations

Note: Selected projects in this category are eligible for entry into the BHP Foundation Science and Engineering Awards National Competition

What to do

1. Choose a topic for your investigation.
2. Keep an electronic or written journal or notebook that explains what you do and why. (handwritten journals maybe scanned for electronic entry submission)
3. Collect the necessary background information and set some realistic aims.
4. Design and perform one or more experiments that will make up the investigation.
5. Analyse the results and draw your conclusions.
6. Present a report to tell others what you did and what you found out. Include any references and acknowledge the assistance you receive.

What makes a winning entry?

- The topic of the investigation should be relevant, original and creative It should address an issue of scientific significance that may be of a social, local or personal nature.
- The approach should be original, creative and resourceful.
- The use of and/or design of equipment should be original and creative.
- The report should include:
  - Realistic aims
  - Details of the materials used and the procedure
  - Risk assessment
  - Determination of variables to control
  - Evidence of replication of results, accuracy and thoroughness
  - Results, observations, measurements, graphics and text
  - Discussion of the results referring to the aims
  - Explanation of errors and anomalies
  - Reasonable conclusion from the data
  - Suggestions for further research
  - Appropriately acknowledge any assistance. Clarify which aspects of the project were devised and carried out alone and which aspects were not and what sort of assistance was provided.

The Journal, logbook or notebook

This shows the purpose behind the study, and the way in which the question evolved and was tackled, as well as a record of how the work progressed (including the disasters).

- Good notes show consistency and thoroughness to the judges.
- A reflective journal could be kept. It should contain evidence of scientific thought.

Some ideas to get you started

- Does the temperature of a magnet affect its strength?
- How does the type of soil affect the growth of a bean plant?
- Which type of paper towel has the highest level of absorption/capillary action?
- Which material is the best for insulating a can of drink?
- How does sugar affect the growth of yeast?
- What is the best metal conductor?
- How fast does light travel in different substances?
- Which tea contains the least amount of caffeine?

Judging Criteria

STAQ Science Teachers Association of Queensland

SCIENTIFIC INVESTIGATIONS

			5 Exceed expectations of student's learning level	4	3 Evident and appropriate to learning level	2	1	0 Not Evident
Investigative Process	Choice of Topic	Provides an appropriate aim. Predicts results and/or describes a hypotheses to be tested.						
		Explains how and why they chose the topic and approach to the investigation						
		Description of how project fits into a wider scientific context						
	Plan of the Investigation	Planning of fair investigation						
		Identifies and describes how variables are controlled where necessary						
		Description of how to manage the work safely, collection of reliable data and other evidence						
	Interprets Results	Summarising data using graphs, tables and other representations, appropriate use of mathematics, description of trends and relationships						
		Identification of errors and reference to plausible causes of errors						
	Findings and Conclusions	Writes a conclusion that discusses the key findings of the investigation Was my initial aim/ hypotheses achieved?						
		Communicates the investigation and findings appropriately using scientific language and representations						
Science Focus	Validity	Draws on relevant evidence and relationships to support conclusions						
	Understanding	Suggests effective improvements to methods and quality of data collection						
	Creative	Demonstrates and original and creative approach to solving the problem showing ingenuity/originality						
Evidence of ownership	Legibility	Presents the investigation in a legible, logical and appealing manner.						
	Acknowledgements	Acknowledges resources used (including reference materials and assistance from other people).						
	Evidence	Has provided detailed evidence of work (such as draft, workings and/or notes) ensuring the investigation is a true representation of the student's learning and understanding.						
		TOTAL						