

Experimental Research

(Junior, Intermediate & Open Divisions)

Experimental research involves:

1. Choosing and defining a topic. Pick a topic that interests you.
2. Asking questions about your topic. Why? What if...? How? It would be a good idea to do some reading about your selected topic. Libraries and the internet are useful resources. You could also discuss ideas with others familiar with your topic.
3. Forming an hypothesis. This is an educated "guess" as to what you think will happen in a certain set of circumstances or conditions. (Look at ONE change at a time).
4. Investigating your hypothesis. To do this properly you need to design and carry out experiments in a safe manner. Data logging equipment can be used to collect data.
 - The method should be logical and test the hypothesis.
 - Allow sufficient time to get meaningful results.
 - Repeating the experiment a number of times can reduce random errors.
 - Experimental Controls make results meaningful.
5. Carefully recording the results of the experiments. A survey, if it is used to collect data as part of an investigation, is regarded by STS as an experiment. (Keeping a log book or taking photographs are useful ways of recording).
6. Analysing results. What do your results mean?
7. Being prepared to change your original ideas and procedures as you get unexpected results.
8. Working logically through your results to support or disprove your hypothesis.
9. Writing a report to tell others what you did and what you found, based on experiments you carried out. The experimental report is NOT a research assignment.

Writing an experimental research report

✓ Tick that you have satisfied each of the guidelines below.

Entry guidelines

Your report format must include the following headings:

- Abstract** - Give a brief description of what you did and what you achieved.
- Introduction** - This must be relevant to the topic and explain why you chose this topic. It must define key terms and provide some background information as well as answering the question "what were you looking at?" Some information from your background reading would be useful.

- Aim** - this must give a clear indication of your investigation. Include your hypothesis.
- Materials** - List or describe the equipment you used to carry out your experiment.
- Method** - Presentation of the method should allow someone else to follow your experiment step by step. Method should report what was actually done, not what you should do. Include any mistakes. Remember to include a description of the safety precautions you used to conduct the experiment. For example, "because the chemicals were corrosive, we wore safety goggles".
- Observations and Results** - Present your results in an easily understood format which may include tables, graphs, photos, maps and descriptions. All information should be clearly labelled. Where possible, results should involve measurement. Avoid subjective results such as those involving likes and dislikes.
- Discussion** - Analyse what your results show. Discuss the implications and validity of your results. Did your results support or disprove your hypothesis? What problems did you encounter? How could you improve on your experimental design or data collection? What errors could you have made? Reflect on unexpected results.
- Conclusion** - The conclusion must relate to the aim. Has the hypothesis been supported or disproved?
- Acknowledgements and references**
A reference list must be included. All research is based on some background information. You should list the books, journals and websites you referred to and the people who gave you help or advice. Specific information from another source, when used, must be cited. See page 23 for methods of citing others' work.
- When finished ask your teacher or parent(s) to check your report to make sure it follows the guidelines.
- Keep a copy of your work in case the original is misplaced.
- Present your report stapled into a paper manila folder (not plastic), with completed yellow Face Sheet firmly affixed to the outside front cover. (This assists with postage and transport of entries.) Do not include samples (leaves, fabric, etc.)
- Posters, videos and other accessories are not judged.

Entries must be posted or delivered to:

STAV House, (PO Box 109)
5 Munro Street Coburg VIC 3058
and arrive by 29 July 2011

All guidelines should be followed to avoid being disadvantaged during judging.

Students who submit a project into the experimental research section are automatically entered into the **National BHP Billiton Science Awards**. Students who win major bursaries in this section of STS will become finalists in this national competition. You must notify STS if you do NOT want your project forwarded to BHP Billiton Awards. For more information go to <http://www.scienceawards.org.au>