



(Lower, Middle and Upper Primary Divisions)

Experimental research involves:

1. Choosing and defining a topic. Pick a topic that interests you. Does not need to be based on this year's theme.
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 very 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 will need to design and carry out experiments in a safe manner.
 - Data logging equipment can be used to collect data.
 - If able, repeat the experiment a number of times to reduce random errors.
 - Use experimental controls eg. variables, to make results more meaningful.
5. Carefully record 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 results which may be unexpected.
8. Working logically through your results so as 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 may be written in passive or active voice but must include the following:

- Introduction** - What gave you the idea? How did you get started? Provide some background information on the topic.

- Aim** - What you are trying to find out?
- Hypothesis** - A scientific guess on what you think will happen based on your initial understanding of your idea
- Materials** - List everything used!
- Method** - List everything you did, but remember to keep them in order (like a recipe).
- Describe the **safety requirements** you followed in conducting this experiment. Attach **Risk Assessment Form**, sample provided on page 23.
- Results** - Everything you discovered (or found out). Keep a little book (logbook) and record everything as you go. To show all this use graphs, tables, pie charts, photos etc...
- Discussion** - Judges pay particular attention to the quality of your discussion. Consider using the following questions as prompts. (Discussion should not be question/answer style)
 - What happened and what did you learn?
 - Did it reflect your hypothesis? Do you think you know why?
 - Did you find any unexpected results? Can you explain this?
 - What problems did you encounter?
 - How could you improve on your experiment or data collection?
- Conclusion** - This is a simple paragraph that links back to your aim and hypothesis. Did you find out what you wanted? Was your hypothesis right?
- Acknowledgements and References** - Make sure you include a list of people who gave you help/advice and outline the ways they helped you.
- List any books or websites you used. (See page 23 to reference correctly)
- When your report is finished ask your teacher or parent(s) to check your report to make sure it follows the guidelines.
- Keep a full electronic copy of your work**, including scans of log book etc. See page 23 for naming your file
- Present your report stapled into a paper manila folder (not plastic), with completed yellow Face Sheet firmly attached to the outside front cover. This will also assist with postage and transport of entries.

Entries must be posted or delivered to:

STAV House, (PO Box 109)
5 Munro Street Coburg VIC 3058
and arrive by 20 July 2018

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 Foundation Science and Engineering Awards**. Students who win major bursaries in this section of STS will be shortlisted for selection as a finalist 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>

Experimental Research

(Junior, Intermediate & Open Divisions)

Experimental research involves:

1. Choosing and defining a topic. Pick a topic that interests you, preferably one which will give you the opportunity to learn something you did not already know.
2. Asking questions about your topic. What if...? Search out what has been done previously (libraries, internet) in this area. Maybe also discuss ideas with others familiar with your topic. If it is a standard experiment (from the web, for example), make some changes, or repeat the experiment a few times under different conditions.
3. Forming an hypothesis: what you think will happen in a certain set of circumstances/conditions. Make it specific, so that at the end, you can clearly say "proven" or "dis-proven".
4. Investigating your hypothesis. To do this properly you need to design and carry out experiments in a safe manner.
 - The method should be logical and test the hypothesis.
 - Allow sufficient time to get meaningful results.
 - Repeat the experiment several times to reduce random errors.
 - Use Experimental Controls to 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. You may want to completely change the topic if something unexpected shows up.
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 library research assignment.

Writing an experimental research report

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

Entry guidelines

Your report format may be written in passive or active voice but must include the following headings:

- Abstract** - Give a brief description of what you did and what you achieved. Around 100 words should suffice.
- 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?"

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Some information from your background reading would be useful.

- Aim** - this must give a clear indication of your investigation. Include your specific 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. Attach **Risk Assessment Form**, sample provided on page 23.
- 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** - Judges pay particular attention to the quality of your 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. Acknowledge the people who gave you help or advice and explain in what ways they helped you. 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 full electronic copy of your work**, including scans of log book etc. See page 23 for naming your file
- Staple your report into a paper (not plastic) manila folder, with completed yellow Face Sheet firmly attached to the outside front cover. (This assists with postage and handling of entries.) Do not include samples (leaves, fabric, etc.)
- Posters, videos and other accessories are not judged.

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