# Year 10 Science
# Student Research Project
# Assessment Task 2 2025

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| **TOPIC:** Student Research Project | **MARKS**: Graded |
| **SUBMISSION REQUIREMENTS**:<br>CANVAS online submission *Thursday 12th June by 11:59pm.* | **WEIGHTING**: N/A |

**TASK DESCRIPTION**:

**You are to plan, conduct and report on a primary investigation of your own choosing.**

Students will develop and conduct a hands-on practical investigation then analyse and evaluate their results to draw conclusions. Students will be required to produce a scientific report alongside their planning that presents their research.

As part of ROSA requirements, you will conduct a research project. The Student Research Project must follow the structure of a Scientific Report and demonstrate your ability to develop scientific questions, plan an investigation and communicate findings using appropriate scientific language, conventions and representations.

This is a compulsory Assessment Task that must be completed to achieve a ROSA in Science.
Requirements

- Complete a full scientific report, including all sections outlined in the scaffold attached.
- The Student Research Project must be typed up and submitted via **CANVAS on Thursday 12th June by 11:59pm.**
- Use the marking criteria as a guide to the requirements of the project.
- All work should be your own and must be in your own words.
- The Student Research Project must be completed on your own.
- Safety is an important part of any scientific investigation. It is essential that you carry out your project with safety in your mind.
- If you do not submit all parts of your Student Research Project, an Academic Warning Letter may be issued.

**PLEASE NOTE: DO NOT SUBMIT THE ATTACHED SCAFFOLD.** This is to help you organise your thoughts in class. You must type your report onto a document or PDF and submit on CANVAS.

**OUTCOMES TO BE ASSESSED**:
**SC5-4WS Develops** questions or hypotheses to be investigated scientifically.
**SC5-5WS Produces** a plan to **investigate** identified questions, hypotheses or problems individually.
**SC5-6WS Undertake**s a first-hand investigation to collect valid and reliable data and information individually.
**SC5-7WS Processes**, **analyses** and **evaluates** data from first-hand investigations and secondary sources to develop evidence-based arguments and conclusions.
**SC5-8WS Applies** scientific understanding and critical thinking skills to suggest possible solutions to identified problems.

**DIRECTIONAL VERBS**:
**Develops -** to invent or create new products, processes, or solutions.
**Produce** - to bring into existence by intellectual or creative ability.
**Investigate** - to conduct a thorough study or analysis to discover new information or validate existing knowledge
**Undertake** - to take upon oneself to perform a first-hand investigation.
**Processes** - a sequence of operations or steps taken to achieve a specific objective
**Analyse** – identify components and the relationship between them, draw out and relate implications.
**Evaluate** – make a judgement based on criteria; determine the value of.
**Apply** – use, utilise, employ in a particular situation.

# Student Research Project - Example Topics

A range of example topics have been provided by NSW Education. Some of these are listed below:

## Biology

Does sugar in the water make cut flowers last longer?

Does music increase the rate of plant growth?

Do different lights affect the growth of plants?

How does soap affect the growth of microorganisms?

How does salt affect the growth of microorganisms?

## Chemistry

Does temperature affect the size of crystals?

How does particle size affect the rate of a chemical reaction?

Do cola drinks dissolve teeth or coins?

Which toilet paper brand is the strongest?

Which battery lasts the longest?

## Earth and Environmental Science

Do different types of rocks absorb different amounts of water?

Do different types of minerals have different levels of electrical conductivity?

What is the best way to prevent soil erosion?

What kind of substrate is the best for preserving fossils?

Can the colour of soil determine the amount of moisture in the soil?

## Physics

Which paper aeroplane design causes the least drag?

How does the shape of a kite affect the time of its flight?

What is the best material for blocking out sound?

How does temperature affect the elasticity of rubber bands?

How does the mass of an asteroid change the size of an impact crater?

# Student Research Project – Draft/Scaffold

PLEASE NOTE: DO NOT SUBMIT THIS SCAFFOLD.

This is to help you organise your thoughts in class. You must type your report onto a document or PDF and submit on CANVAS.

Title: _____

## Background information:

Gather any background information that is relevant to your investigation here. This could include photos, diagrams, observations or the results of other scientists' investigations. Make sure you record all sources of information for the list of references.

## Aim:

What is the aim of your investigation?

## Variables:

What are the dependent and independent variables in your investigation? What are at least three controlled variables?

| **I will change:** (independent variable) | **I will measure:** (dependent variable) |
| --- | --- |
| | |
| **I will keep the same:** (controlled variables) | |
| | |

How will the controlled variables maintain validity?

## Inquiry Question:

Develop a question that your investigation will aim to answer.

## Hypothesis:

What is your hypothesis for this investigation?

## Risk Assessment:

Complete the table below by listing all of the potential hazards presented by your investigation. For each hazard you identify:

1. Explain why it is dangerous.
2. List the safety rules you will follow to remove the risks to you, other people, the equipment and the environment.

| RISK/HAZARD | Injury<br>Why is it Dangerous? | Precaution<br>Safety rules to follow |
|---|---|---|
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## Equipment:

What materials and equipment do you need to carry out the investigation?

Draw a labelled diagram of how you will set up the materials and equipment.

## Method:

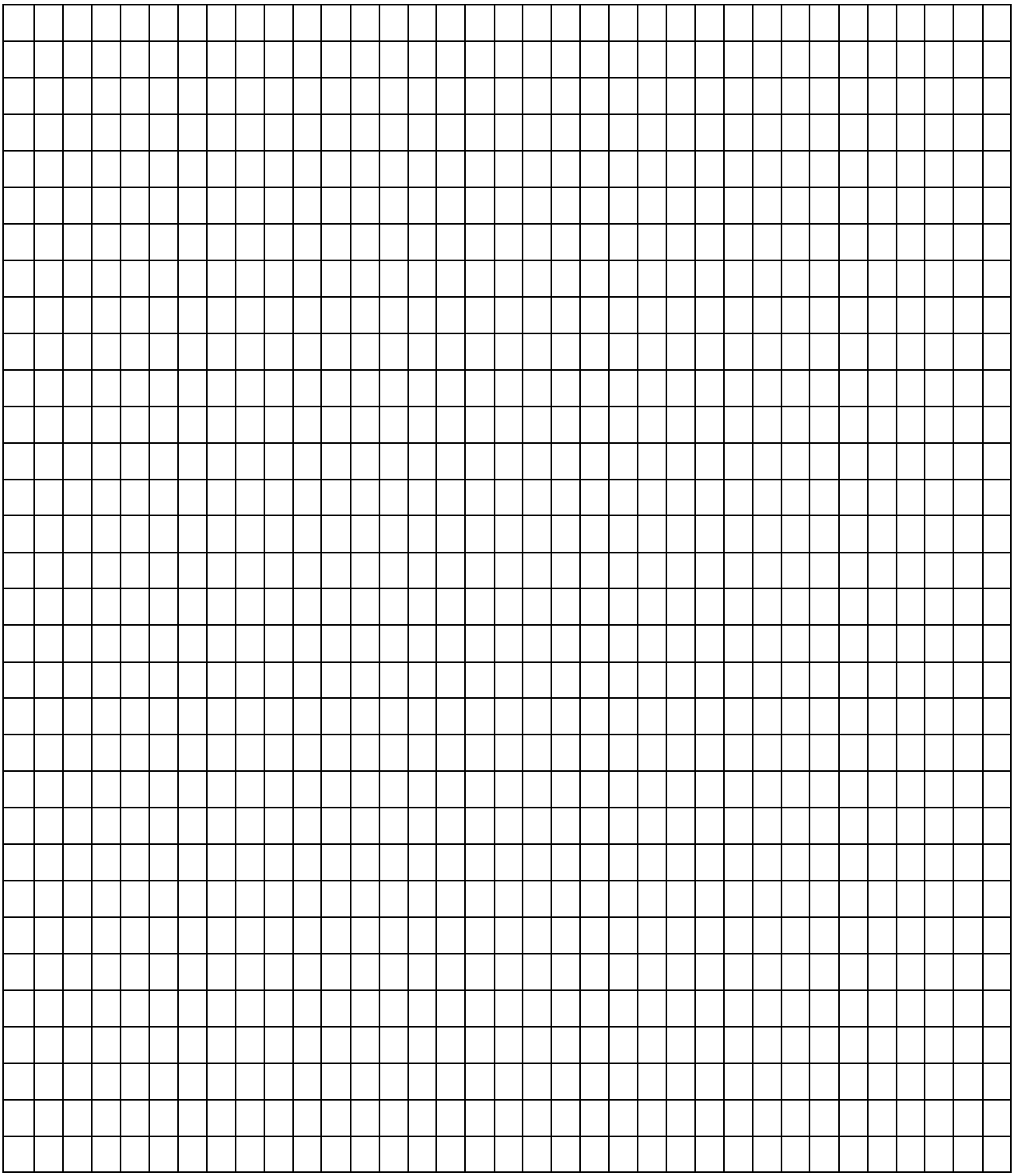
What are the steps you will follow to complete the investigation?

## Results:

Record your observations, measurements and any other results.

Construct a graph of your results. You may wish to draw it on graph paper and upload a photo, or use excel.

Title: _____



Discussion:

Below is a list of questions or points you should aim to address in your discussion. DO NOT answer these as question and answer. Your discussion should be framed as a piece of writing, with paragraphs and structured similar to an essay.

1. Describe what happened in the experiment. Outline what the results show, referring to the data in your response.
2. Using scientific concepts, explain the relationships you have identified between the variables in your investigation.
3. Do your results agree with your hypothesis? Explain.
4. Link your findings back your background information. To do this you will have to re-read the introduction and perhaps look up some more information.
5. Assess the validity and reliability of this experiment. Identify potential sources of error and how they can be overcome if you repeated the experiment again.
6. Reflect on your investigation and identify what worked well and what you could improve.
7. What new questions do you have? What are you wondering about or would like to investigate further?

## Conclusion:

Write a conclusion for your investigation.

## References:

What sources helped you during your investigation and how? List any references you used, e.g. websites, books, etc.

# MARKING CRITERIA – Student Research Project

| Outcome | Component | E - Beginning | D - Developing | C - Competent | B - Accomplished | A - Exemplary |
|---|---|---|---|---|---|---|
| SC5-4WS | **Background Information** | No background Information has been included. | Presents limited background information with minimal relevance to the topic. Shows a poor understanding of key concepts and context. | Provides adequate background information that covers basic aspects of the topic. Displays a general understanding of key concepts but may lack depth. Includes some credible source information. | Offers thorough background information that is mostly relevant to the topic. Shows a strong understanding of key concepts and context. Utilises several credible sources. Communicates ideas clearly, with minor lapses in coherence. | Provides comprehensive and detailed background information relevant to the topic. Demonstrates exceptional understanding of key concepts and context. Integrates a wide range of credible sources. Clearly communicates complex ideas in a coherent manner. |
| | **Aim** | An aim has not been provided. | States an unclear or vague aim that does not effectively relate to the research question. | Presents a general aim that is somewhat relevant to the research question. | States a clear and relevant aim that aligns with the research question. | Clearly articulates a focused, precise, and relevant aim that aligns with the research question. |
| | **Question** | A question has not been asked. | A question has been asked but it is unclear. | A question has been asked using scientific language. | A clear question has been asked using scientific language. | A clear, concise question has been asked using sophisticated scientific language. |
| | **Hypothesis** | A hypothesis has not been framed. | Poorly worded hypothesis. May not have referred to the variables correctly. | A statement of prediction of the relationship between the variables. | The hypothesis is valid. It is testable, includes a prediction and is based on variables. | A clear, testable hypothesis has been framed in terms of the independent and dependent variables and is based on scientific theory. |
| SC5-5WS | **Variables** | Variables have not been identified. | Correctly identifies one or 2 of the following: dependent, independent, or controlled variables. | Correctly identifies the dependent and independent variables. Controlled variables are listed. However, how they are kept constant may not be described or are not suitable. | Correctly identifies the dependent and independent variables. All controlled variables have been identified, and strategies to keep the controlled variables constant are valid. | |
| | **Risk Assessment** | Does not provide a risk assessment or identifies irrelevant hazard. | Presents a limited risk assessment with few identified hazards. Offers minimal evaluation of risks and inadequate control measures. | Provides a basic risk assessment that identifies some potential hazards. Discusses risks for some hazards but may lack detail in control measures. | Presents a thorough risk assessment that identifies most potential hazards. Assesses risks and proposes appropriate control measures for most hazards. | Provides a comprehensive and detailed risk assessment that identifies all potential hazards. Clearly evaluates the risks associated with each hazard and outlines effective control measures. |
| | **Materials and Equipment** | A list of materials and equipment has not been provided. | Some of the required materials and equipment have been listed. | All of the required materials and equipment have been listed, including precise amounts and sizes. | | |

| Outcome | Component | E - Beginning | D - Developing | C - Competent | B - Accomplished | A - Exemplary |
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| | **Method** | A method has not been provided. | The method is missing information. Units and or quantities may be incorrect or absent. It may not be written in the third person or past tense. | Appropriate method. Well written, although some minor details may be missing. May jump between active and passive voice and or present and past tense. | Excellent method, written so that it could be repeated precisely by another person without prior knowledge of the experiment. Written in passive voice, past tense. | |
| **SC5-6WS** | **Results: Table** | No results have been recorded. | Data is poorly displayed or unorganised. Some components of the table are missing. | Data is displayed in an organised table which includes headings and units. Data is clearly recorded. Some minor details may be missing. | Data is displayed in a well-organised table which includes all headings and correct units. Data is accurately recorded. | |
| | **Results: Graph** | No graph has been developed. | Attempts to demonstrate some graphing skills. | Produces a graph with some errors. | Produces a substantially correct graph with minor errors. | Constructs a correct graph that includes all of the following features:<br>○ Axes labelled with units<br>○ Appropriate scale<br>○ Correctly plotted<br>○ Line of best fit drawn<br>○ Descriptive title |
| **SC5-7WS** | **Discussion: Description of results** | Results have not been described. | Limited description of results. Ideas are not clearly expressed. | Basic description of results and an attempt has been made to explain results (possibly incorrectly). | Results are correctly described. Valid explanation of results has been provided. | Results have been clearly and correctly described. Clear and valid explanation of results is provided. In addition, the discussion demonstrates an understanding of the content of the investigation. |
| | **Discussion: Analysis of results** | Results have not been summarised or analysed. | An attempt to summarise or analyse the results has been made. | The results have been summarised and analysed with reference to the hypothesis. They have been discussed in general terms. | The results have been summarised and analysed with reference to the hypothesis. They have been discussed and linked to scientific concepts. | All results have been summarised and thoroughly analysed with reference to the hypothesis. They have been discussed in detail and linked to relevant scientific concepts. |
| | **Discussion: Validity and Reliability** | Does not mention validity or reliability. | Identifies one method/technique to improve reliability OR validity. | Identifies one method/technique to improve reliability AND validity. | Describes two methods/techniques to improve reliability.<br>Describes two methods/techniques to improve validity. | Explains two methods/techniques to improve reliability (reduce random error, repetition and averages).<br>Explains two methods/techniques improve validity (correct equipment, effective method). |

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| **SC5-8WS** | **Discussion: Sources of error and further research** | Does not discuss sources of error and further research. | One possible source of error has been identified. May have suggested improvements. | Some sources of error have been identified, and improvements have been suggested. However, they may be inadequate. | Some sources of error have been identified, and adequate improvements have been suggested. | Possible sources of error have been identified, and adequate improvements have been suggested to improve. |
| | **Conclusion** | A conclusion has not been provided. | The conclusion lacks detail. It states if the hypothesis is supported or refuted; however, limited reasons are given. | An acceptable conclusion is drawn which correctly states how the hypothesis has been supported or refuted. | Correctly identifies and explains how the evidence supports or refutes the hypothesis. Justifies inferences and conclusions. | |
| | **Language** | Scientific language and conventions have not been used. | Minimal scientific language and conventions have been used to construct evidence-based arguments. | Scientific language and conventions have been used to construct evidence-based arguments. | Accurate scientific language and conventions have been used to construct evidence-based arguments and formally present the results. | Sophisticated scientific language and conventions, including mathematics, have been used to construct evidence-based arguments and formally present the results. |
| | **References** | No sources referenced | Sources referenced are not reliable, and information may be missing. | Some sources are referenced but may have information missing. | Several relevant sources are referenced in the correct format. | |

**COMMENT:** _____

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**TOTAL Grade:**