



**PICTON HIGH SCHOOL**  
**STAGE 5 Science**  
**Year 10 Student Research Project**

<b>Due Date: Friday 23rd October 2020</b>	<b>Assessment Name: Student Research Project</b>
<b>Mark: /52</b>	<b>Weighting: 30 %</b>

**Syllabus Outcomes:**

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 undertakes first-hand investigations 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

SC5-9WS **presents** science ideas and evidence for a particular purpose and to a specific audience, using appropriate scientific language, conventions and representations

**TASK DESCRIPTION:**

Choose a topic of interest to carry out an investigation and write a report as detailed in the booklet.

Marking Guidelines are to be found at the end of the booklet.

# STUDENT RESEARCH PROJECT

All students in year 10 are required to complete a Science Research Project. The marks for this project are included in your assessment for the ROSA Award. It **must** be completed by the due date. No extensions will be given except in accordance with the school's policy.

The project will show how your skills as a scientist have developed. The project you complete should be something that you will be proud of and based on something you are interested in. Don't forget to use the Internet and the library, together with many other organisations to obtain your background information. This project is very different from other projects as it involves solving a problem, not just gathering information. You will be given eight (8) weeks to complete the project. To make sure that the work is completed on time, use the time line below as a guide. You may need to vary the time line depending on the type of project you do.

The SRP is made up of 2 parts:

## **1. Logbook**

- This is a diary of what you did during your scientific investigation. In the logbook you will make rough notes, to-do-lists, draw up plans, record ideas and results. You may include diagrams, illustrations and web site addresses from your research.
- Each entry should include a date so that you are showing your progress towards a finished product.
- The logbook needs to be as long as you want (without waffling) but should be at least 1 page long.
- You may present it in electronic form or written form. It may be decorated beautifully or just roughly written. You will be marked for your content, not your presentation (but please don't hand it in on a scrap of paper - organisation is important). Your teacher may want you to submit a paper copy if you are using an electronic method of recording. Ask your teacher.
- This **MUST** be submitted with your final report.

## **2. Final Report (This final report scaffold may be helpful)**

- Set out your report using the following headings:
  - Title
  - Introduction
  - Aim
  - Hypothesis
  - Variables
  - Risk Assessment
  - Materials
  - Method
  - Results
  - Discussion (and data analysis)
  - Conclusion
  - Correctly formatted bibliography

Links that may be of help in completing this:

<https://www.sciencebuddies.org/science-fair-projects/science-fair/steps-of-the-scientific-method>

<https://explorable.com/conduct-science-experiments>

<http://edtech2.boisestate.edu/angelacovil/506/procedure.html>

## How to get started

### STEP 1 Decide on your idea for an investigation

- a) You should pick an investigation that interests you (REALLY interests you). The best thing to investigate is often something that strikes you as worth doing - something that you have seen and wondered about and you want to look at more closely.
- b) Think carefully to decide if your idea is feasible:
  - Can it be investigated experimentally; can you collect quantitative data?
  - Many behavioural investigations are too difficult for you to test in a valid scientific manner
  - Can you get the materials you need?
  - Have you got time to finish it?
    - Is it dangerous or cruel? If it is then no, you can't do it.  
*Your project cannot involve explosions, poisons or flammable substances*
    - *Do not use 240 Volts when constructing circuits.*
    - *You must not be cruel to animals. Studies of animals need to be approved by your teacher.*
    - *Do not damage the environment.*
  - Does it depend on the weather (eg growing seeds and plants)?
- c) Discuss your decision with your teacher before proceeding.

### STEP 2 Get started ..... set up a logbook.

A handwritten document is easiest and it does not need to be perfect.

- a) Look in library books, magazines or on the Internet to find out more about your idea. Make sure you use a wide range of sources and write down this information, with the reference details, in your logbook. This information should be used in your introduction and will help in your discussion.
- b) Record all your ideas, research, failures, changes and progress.
- c) Do NOT erase anything. The logbook shows evidence of the evolution of your project so leave everything in it, mistakes and all.

### STEP 3 Conduct your investigation

- a) Create a risk assessment (Hazard / Risk / Precaution) and get it signed by your teacher BEFORE you start. Follow the safety procedures you have identified.
- b) Keep careful notes; put your notes straight into your logbook so they are not lost.
- c) Use tables and graphs, photographs and video records where they are appropriate.
- d) Record your successes and failures in your logbook— you often learn more from your failures than your successes. Adjust your method and start again if needed.
- e) After each experiment, ask "What if ...", then try it - as long as it's safe and included in your original approved risk assessment!
- f) Be prepared to change your ideas as you get results from your experiments. Record these changes.
- g) Repeat to be able to assess reliability. Do each component of the experiment more than once to obtain reliable results. As many times as practical, this may be 5 times, it may be 100 times. Calculate an average when you collect repeated quantitative data.

### STEP 4 Prepare your final report and submit it with your logbook.

Remember to put your name clearly on the FRONT page or in the NAME OF YOUR FILE and include all sections of the report.

## Writing your report

Your final report cannot be completed until you have all your results. You can, however, start to get it together earlier. It should be typed or neatly written on A4 paper (standard sized paper). It should begin with a **Table of contents**, and all **pages should be numbered**. Your report should include the following

### 1. **Introduction:** -

- Present all relevant background information. Include things like the problem you are investigating and how you thought of it. You could also explain why you became interested in the topic. You need to indicate any background information that you have found from secondary sources, while researching your experiment.

### 2. **Aim:** Briefly state the purpose of your investigation.

### 3. **Hypothesis:**

- Make an educated guess about what you expect to find out. Your hypothesis forms the basic idea that you are going to test. You should only investigate the effect of changing one thing.

### 4. **Materials and method:-**

- Begin with a list of the materials you used in carrying out your investigation.
- Write your method as a series of steps set out in the order you would do them.
- Describe how you carried out your experiment. It should be clearly written so that another person could repeat your experiment.
- Make it clear which things are the variables you have controlled in your experiment and how you made your measurements.
- Label all diagrams clearly.

### 5. **Results**

- Observations and measurements are recorded here.
- Where possible, present data in tables and graphs. Ensure the tables and graphs are clearly labelled and titled.

### 6. **Discussion**

- Discuss your results here.
- Begin with a statement of what your results demonstrate and how it compares with your hypothesis. Use the PEEL structure for your paragraph.
- Discuss any weaknesses in your design or difficulties that you had with your investigation.
- Explain how you could have improved your experiment.
- Evaluate the success of your investigation.

### 7. **Conclusion**

- This is a brief statement about what you found out. It should be based on your Aim and also report on what you found out about the Hypothesis.
- If you did not achieve your aim say so, you will not lose marks if your experiment did not work the way you thought it would, provided you have done everything correctly.
- Suggest further experiments that could be done on your topic.

### 8. **Bibliography-** Acknowledge sources if applicable.

**9. Appendix-** A series of photographs to be included here.

## How to write a bibliography

### Internet sources

Author's surname followed by their initials (if identified) Last update (if identified) in brackets  
Title of article in italics or underlined Sponsor name  
[Online]  
<URL address>

**For example:** Ward, C. (2004) *Australian bush fires burn on*, Disaster Relief, [Online] <http://disasterrelief.org/Disasters/020104Austfires4> [accessed 10/1/2013]

### Books

Author's surname followed by their initials Year of publication in brackets  
Title in italics or underlined Edition (if relevant)  
Publisher and the place of publication  
(If the author is unknown, put the book title first)

**For example:** Denning, A. (1994) *The craft of woodcarving*, Sandstone: London

## PROJECT IDEAS

If you are finding it hard to form an idea, see your teacher for help  
You cannot use the same research task that you completed in yr 9. This means that the following 5 topics cannot be chosen as your task.

### Cannot be chosen

- A. Compare one variable that affects the bounce of a ball.
- B. Measure the effect of exercise on heart rate.
- C. Comparison of the rate of corrosion of a nail in salty water.
- D. Determine through research and then establish a habitat for Slaters.
- E. Compare the density of rocks.

# Investigation Planner

Creative Title

**Aim:** In this investigation, I am trying to find out

**Hypothesis:** What I predict will be the outcome.

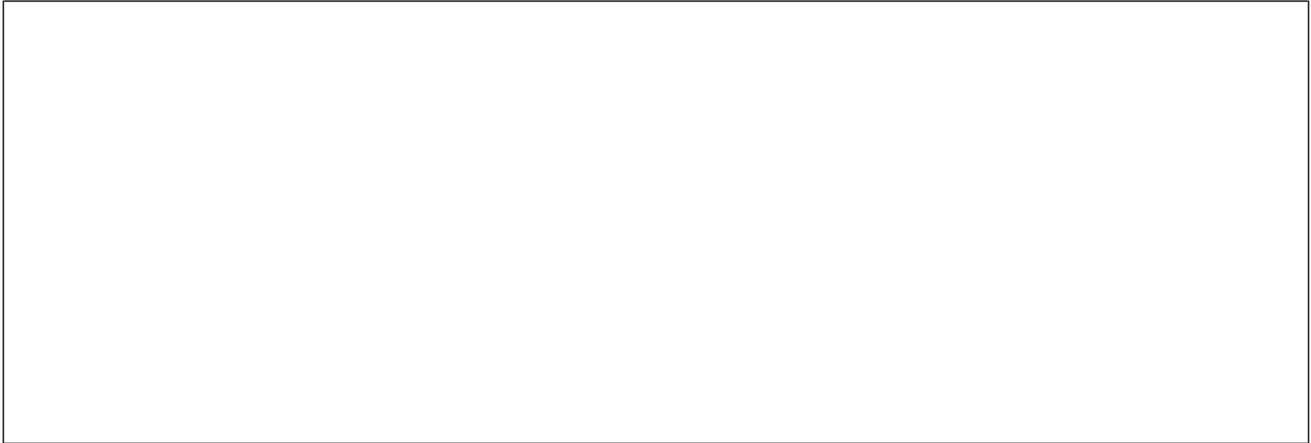
**Independent Variable:** What will I change?

**Dependent Variable:** What will I measure? The measurements will be taken with...

**Controlled variables:** The variables that are kept the same throughout the experiment (because they would change the result if they were allowed to change)

**Control Group**

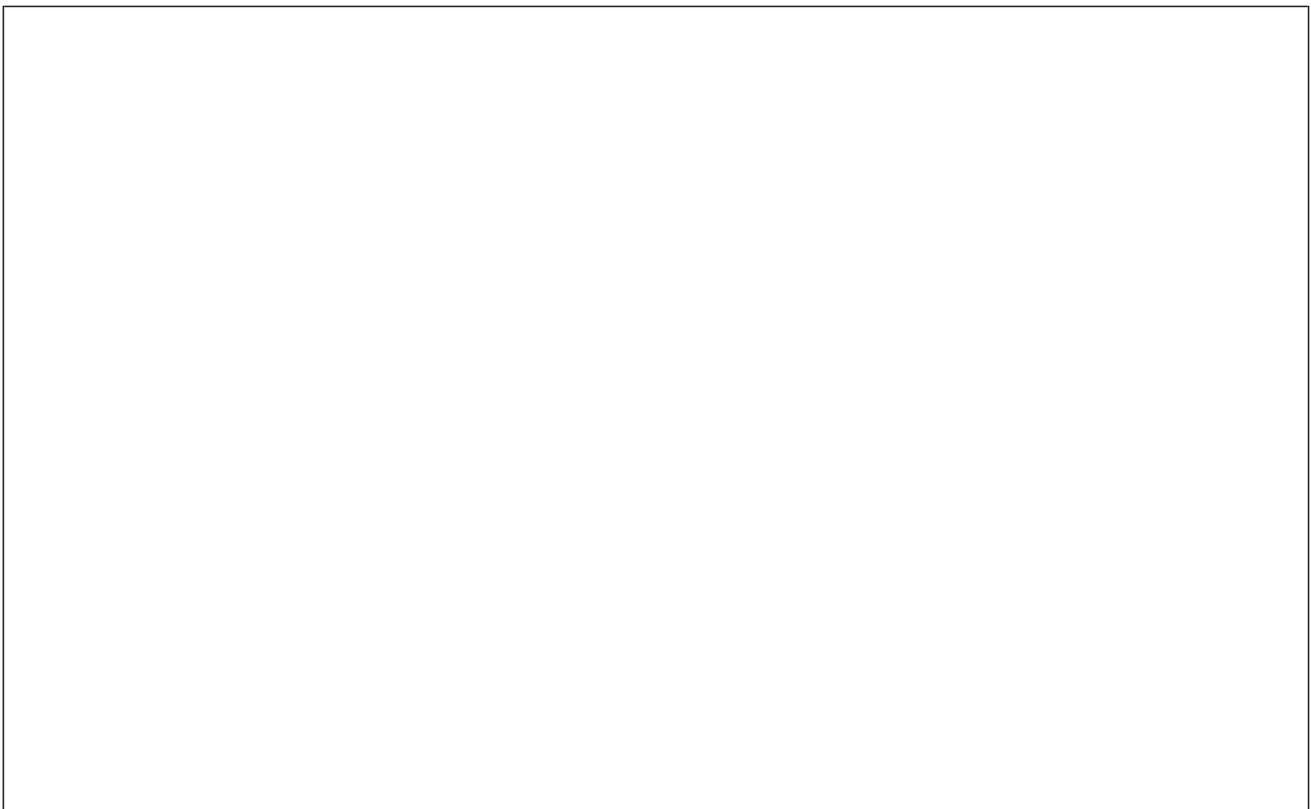
**Materials:** A list of equipment and quantity needed to conduct the experiment.



**Risk Assessment**



**Procedure:** An outline of the experiment that you intend to conduct by drawing a diagram of the set up or listing the steps



## YEAR 10 RESEARCH PROJECT LOG SHEET

Name: \_\_\_\_\_ Class: \_\_\_\_\_

Week	Task to be Completed	Weighting (%)	Teacher's Signature
1	Research and choose topic. Write an hypothesis and an aim  Submit journal	3	
2	Continue background investigation to decide on the equipment required and strategy for testing		
3	Design experiment and prepare a draft of your method, equipment list and a results table.  Submit journal	3	
4	Organise the equipment, test procedure		
5	Perform the experiment and collect raw data  Submit journal	2	
6	Write draft of the test report. Ensure that the bibliography is also presented in the correct format.  Submit Journal	2	
7	Make changes as required, prepare final report		
8	Present final report  Submit Completed Task		

Total for Log

/10

## A Scaffold for P.E.E.L

Your paragraph should be written following this structure:

1. **Point sentence:** Write your statement about what the results demonstrate.
2. **Explain:** Explain your point further.
3. **Examples:** Provide evidence or specific examples to support your statement about what your results demonstrate.
4. **Links:** Write a sentence which links to your results and your hypothesis.

# Marking Criteria for Year 10 Science Investigation Project

NAME: \_\_\_\_\_

Outcome	Criteria	Marks
<b>SC5-4WS</b> Hypothesis	formulated a testable hypothesis based on prior research/previous observations	3
	proposed a hypothesis based on prior research or previous observations	2
	proposed a hypothesis either loosely or not related to the background information collected	1
	not attempted	0
TOTAL		/3

Outcome	Criteria	Marks
<b>SC5-5WS</b> Planning	completed a valid and well planned scientific investigation over a period of time	4
	completed a well-planned scientific investigation over a period of time	3
	completed a scientific investigation with moderate planning	2
	submitted a project with limited planning	1
	not attempted	0
<b>SC5-5WS</b> Aim	has well defined aims and clearly expressed the subject of the investigation	3
	had some tentative aims and adequately described the subject of the investigation	2
	had no clear aim and vaguely described the subject of the investigation	1
	not attempted	0

<b>SC5-5WS</b> Risk Assessment	identified procedures and performed a risk assessment prior to experimentation	2
	considered experimental risks but did not conduct a formal risk assessment	1
	not attempted	0
<b>SC5-5WS</b> Variables	identified independent and dependent variables and took deliberate steps to keep controlled variables constant	3
	controlled some variables	2
	did not recognise or control variables	1
	Not attempted	0
TOTAL		/12

Outcome	Criteria	Marks
<b>SC5-6WS</b> Repetition Replication Observation	accurately made relevant observations in replicated trials using appropriate technologies	3
	gathered experimental data over a number of trials using appropriate technologies	2
	gathered some first-hand data without replication	1
	not attempted	0
<b>SC5-6WS</b> Logbook	Included a comprehensive logbook, detailing the investigative process, from brainstorming, through data collection, to the final conclusion	3
	included a logbook detailing the different stages of the investigative process	2
	provided limited or disorganised documentation in the accompanying logbook	1
	not attempted	0
TOTAL		/6

<b>Outcome</b>	<b>Criteria</b>	<b>Marks</b>
<b>SC5-7WS</b> Background Research	Included a concise and comprehensive summary of relevant prior research in the field and assessed its reliability	3
	included a summary of current relevant background information and checked its reliability	2
	included some relevant background research	1
	not attempted	0
<b>SC5-7WS</b> Data Recording	recorded data in an organised, sequential and logical manner using correct units	4
	recorded data in a systematic manner using correct units	3
	recorded data using incorrect or no units	2
	did not present the data clearly	1
	not attempted	0
<b>SC5-7WS</b> Data Analysis	analysed and evaluated trends, patterns and relationships in the data collected	4
	analysed and explained trends, patterns and relationships in the data collected	3
	identified occasional trends, patterns and relationships in the data	2
	loosely identified trends, patterns and relationships in the data	1
	not attempted	0
TOTAL		/11

Outcome	Criteria	Marks
<b>SC5-8WS</b> Communication	exhibited deep understanding of related science concepts	4
	demonstrated good understanding of the science concepts used in the investigation	3
	demonstrated minimal understanding of the science concepts used in the investigation	2
	demonstrated inadequate understanding of the science concepts used in the investigation	1
	not attempted	0
<b>SC5-8WS</b> Discussion	suggested worthwhile directions for future research clearly	3
	suggested modifications to procedures and ideas for future research	2
	put forward some ideas for future improvements	1
	not attempted	0
TOTAL		/7

<b>Outcome</b>	<b>Criteria</b>	<b>Marks</b>
<b>SC5-9WS</b> Creativity	was innovative and creative in approach, content, methodology or communication to audience	2
	had some innovative or creative ideas but did not develop them	1
	not attempted	0
<b>SC5-9WS</b> Conclusion	used critical thinking to synthesise information and argue the merits of conclusions	4
	used critical thinking to derive conclusions	3
	formulated conclusions that were not fully supported by experimental data	2
	manufactured conclusions lacking supporting information and scientific accuracy	1
	not attempted	0
<b>SC5-9WS</b> Communication	used clear, concise, consistent and meaningful language, visuals and sequencing to effectively communicate to the intended audience. Bibliography using Harvard referencing style.	4
	communicated the report with effective use of language, visuals and sequencing. Bibliography using Harvard referencing style	3
	communicated the report with adequate use of language, visuals and sequencing, appropriate to the intended audience. Bibliography	2
	communicated the report with poor expression and inadequate use of visuals. Bibliography	1
	not attempted	0
<b>SC5-9WS</b> Acknowledgment	acknowledged the source and type of any assistance given	3
	acknowledged some assistance but did not provide details of the type of assistance given	2
	did not acknowledge assistance given	1
	not attempted	0
<b>TOTAL</b>		<b>/13</b>

