



# Chester Hill High School

*Strength in Unity, Excellence in Education*

<b>Course:</b>	Science	<b>Year:</b>	10
<b>Topic:</b>	Scientific Investigation		
<b>Assessment Name:</b>	Scientific Investigation		
<b>DATE DUE:</b>	Term 2 Week1	<b>Total Mark/Weighting</b>	20
<b>STUDENT NAME:</b>			
<b>Progress Check FEEDBACK</b>	<i>(Individualised based on task – tick a box or lines for feedback)</i>		
	<input type="checkbox"/> Complete Plan <input type="checkbox"/> Complete contract <input type="checkbox"/> Complete investigation as an individual and submit report		
<b>Progress Check Date:</b>		<b>Marks</b>	

I certify that

- This assignment is my own work, based on my personal study and/or research.
- I have **acknowledged all material and sources used in the preparation** of this assignment in a **reference list**.
- Submitted assignments based on group work are not the same as other students' work.
- I have not plagiarised (copied) in part, or in whole the work of other students.
- I have read, and I understand the success criteria used for this assessment
- **I have kept a copy of my assignment and the receipt.**
- I understand that a copy of my assignment may be kept and used to make comparisons with other assignments in the future.

Student's Signature: ..... Date: .....

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### **Assessment Task Student Receipt**

*(This receipt should be kept as proof of assessment submission)*

<b>FAMILY NAME:</b>	<b>GIVEN NAME:</b>
<b>TEACHER:</b>	<b>CLASS:</b>
<b>DATE DUE:</b>	<b>DATE SUBMITTED:</b>
<b>TITLE OF TASK:</b>	<b>TEACHER'S SIGNATURE:</b>

### Task Information

<b>Important idea(s) being explored:</b>	Develop knowledge, understanding of the skills in applying the processes of “Working Scientifically”.
<b>Skills, Knowledge and understanding being demonstrated:</b>	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>○ Plan and safely perform a first-hand investigation to collect valid and reliable data</li> <li>○ Analyse data and use critical thinking to suggest possible improvements and solutions to problems</li> <li>○ Present science ideas using scientific language</li> </ul>
<b>Task Requirements:</b>	<p>In this assessment task you will be asked to investigate an area/problem in science of interest to you that may be of some benefit to society. You will be required to research, plan, safely perform and present a written investigation on this area/problem of interest.</p> <p><b>Part 1:</b> Choose an investigation project and complete student and parent contract</p> <p><b>Part 2:</b> Complete the Scientific Investigation Plan</p> <p><b>Part 3:</b> Carry out the scientific investigation and submit a complete experimental report</p>
<b>Syllabus Outcomes:</b>	<p><u>Skills:</u></p> <p>SC5-WS5 produces a plan to investigate identified questions, hypotheses or problems, individually and collaboratively</p> <p>SC5-WS6 undertakes first-hand investigation to collect valid and reliable data and information, individually and collaboratively</p> <p>SC5-WS7 processes, analyses and evaluates data from first-hand investigations and secondary sources to develop evidence-based arguments and conclusions</p> <p>SC5-WS8 applies scientific understanding and critical thinking skills to suggest possible solutions to identified problems.</p> <p>SC5-WS9 presents science ideas and evidence for a particular purpose and to a specific audience, using appropriate scientific language, conventions, and representations.</p> <p><i>*Refer to the Board of Studies NSW Syllabus for the Australian curriculum Science K-10*</i></p>

**Feedback from student about task:**

I spent \_\_\_\_\_ hours working on this task in class and I spent \_\_\_\_\_ hours working on this task at home.

The hardest part of this task was

\_\_\_\_\_

The easiest was

\_\_\_\_\_

What I have enjoyed most about learning in *SUBJECT* is

\_\_\_\_\_

Learning in *SUBJECT* could be improved if:

\_\_\_\_\_

\_\_\_\_\_

Dear teacher, I need help in the following areas:

\_\_\_\_\_

\_\_\_\_\_

## SCIENTIFIC INVESTIGATION IDEAS

Select one of the scientific investigations that is suitable for you. You may choose another topic, however, alternative topics **MUST** be approved by your teacher.

To help get you started, consider these websites for possible investigation ideas:

[www.education.com/science-fair/](http://www.education.com/science-fair/)

[www.sciencebuddies.org/science-fair-projects/project-ideas/ninth-grade](http://www.sciencebuddies.org/science-fair-projects/project-ideas/ninth-grade)

[www.sciencebuddies.org/science-fair-projects/project-ideas/tenth-grade](http://www.sciencebuddies.org/science-fair-projects/project-ideas/tenth-grade)

[sciencebob.com/category/experiments/](http://sciencebob.com/category/experiments/)

[www.stevespanglerscience.com/lab/experiments/](http://www.stevespanglerscience.com/lab/experiments/)

[www.thoughtco.com/middle-school-science-experiments-604274](http://www.thoughtco.com/middle-school-science-experiments-604274)

These websites are for generating ideas only. *Some experiments listed in these websites may not be appropriate for your investigation due to a lack of variables or for safety reasons.* Please ensure your idea for your scientific investigation is approved by your teacher **BEFORE** you commence planning or experimenting.

Think about which of the following scenarios your chosen idea fits into?

- testing a manufacturers claim
- testing a device
- testing a material
- compare different brands
- testing a myth

**SCIENCE INVESTIGATION PLAN**

- Date due for plan: \_\_\_\_\_

Date due for completed investigation: \_\_\_\_\_

- Name: \_\_\_\_\_

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

**Question**

**Title of Research Project:**

---

**What is the question I want an answer to?**

---

**Which of the five scenarios does this fit into?**

---

**Strategy**

**How will I do this?**

---

**What steps will I take to make this happen?**

---

**To-Do List with Timeline:**

TO-DO:	WHEN?

**Fair Testing**

**What am I keeping the same?**

---

**What am I changing?**

---

**How will this impact my experiment?**

---

**Equipment**

**Where will I be conducting my investigation?**

---

**What are the things I already have?**

---

**What are the things I may need to buy?**

---

**What are the things I need to borrow from school?**

---

**Prediction**

What I am expecting to see after doing my experiment:

---

**Results**

How many trials will I do?

---

How am I going to record my data? Qualitative or quantitative?

Provide a draft table below:

---

How am I going to present my results? Column or line graph?

Provide a draft graph below:

---

**Teacher Approval of Investigation**

You have permission to begin your investigation. If you change the topic or method you will need to submit another plan for approval

Teacher Signature: \_\_\_\_\_

<b><u>Learning Intention/Goal</u></b>	<b><u>STUDENT CHECKLIST</u></b>	<b><u>Check Boxes</u></b>
Design a solution to problem by applying scientific principles and ideas	<b><u>PLAN</u></b> <ul style="list-style-type: none"> <li>- Appropriate title that describes the question under investigation</li> <li>- States the question under investigation</li> <li>- Outlines a strategy/steps required to design an investigation to answer the question</li> <li>- Fair testing principles considered and demonstrated</li> <li>- Materials needed are listed</li> <li>- Prediction of investigation outcome made</li> <li>- Results format planned and demonstrated</li> </ul>	<input type="checkbox"/>
Summarising and collating information from a range of resources	<b><u>INTRODUCTION</u></b> <ul style="list-style-type: none"> <li>- After conducting some research about your topic you must explain why the investigation you have chosen is important and relevant</li> </ul>	<input type="checkbox"/>
State the purpose of undertaking an investigation	<b><u>AIM</u></b> <ul style="list-style-type: none"> <li>- Your aim must clearly state what you are trying to achieve and must start with the word "To" and include both the independent variable and dependent variable.</li> </ul>	<input type="checkbox"/>
Demonstrate the use of the terms 'dependent' and 'independent' and 'control' to describe variables involved in the investigation	<b><u>VARIABLES</u></b> <ul style="list-style-type: none"> <li>- You must identify the independent, dependent, control and controlled variables</li> </ul>	<input type="checkbox"/>
Formulate cause and effect relationships	<b><u>HYPOTHESIS</u></b> <ul style="list-style-type: none"> <li>- You must state an hypothesis (educated guess) of what you believe will happen based on your research in the following format: If.....then.....because.....</li> <li>- The hypothesis should state the effect of changing the independent variable will have on the dependent variable(s).</li> </ul>	<input type="checkbox"/>
Identifying and/or setting up the most appropriate equipment or combination of equipment needed to undertake the investigation	<b><u>MATERIALS</u></b> <ul style="list-style-type: none"> <li>- List all of the equipment, materials and resources you have used in your investigation</li> </ul>	<input type="checkbox"/>
Demonstrate coherence and logical progression and include correct use of the fair testing principles	<b><u>METHOD</u></b> <ul style="list-style-type: none"> <li>- Your method must be written in chronological steps with each step starting with a verb</li> <li>- No personal pronouns are to be used in your method</li> <li>- Your method must state exactly what you did in detail. All of the steps must be changed from the present tense used in your plan to <b><i>past tense</i></b> for your report</li> <li>- Be sure to correctly identify what you are changing in your investigation (the independent variable), what you are going to keep the same (controlled variables) and what you are measuring (dependent variable)</li> </ul>	<input type="checkbox"/>
Carrying out a risk assessment of intended experimental procedures and identifying and addressing potential hazards	<b><u>RISK ASSESSMENT</u></b> <ul style="list-style-type: none"> <li>- You must identify any risks that you may encounter and identify strategies that could be used to reduce these risks</li> </ul>	<input type="checkbox"/>
Selecting and drawing appropriate tables graphs to convey information and relationships clearly and accurately	<b><u>RESULTS</u></b> <ul style="list-style-type: none"> <li>- Your results should be appropriate for your investigation and presented in a scientific form</li> <li>- Results may include tables, graphs, flow charts, databases, observations etc.</li> </ul>	<input type="checkbox"/>
Provide evidence of work using pictorial representations	<b><u>EVIDENCE OF INVESTIGATION</u></b> <ul style="list-style-type: none"> <li>- You must provide evidence that <b><u>you</u></b> conducted this experiment. This may include photographs taken of yourself conducting the experiment or samples of materials used during the experiment</li> </ul>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>- Identify trends, patterns and relationships in data to make inferences and conclusions</li> <li>- Identify and explain how data supports or refutes an hypothesis, a prediction or a proposed solution to a problem</li> <li>- Predict outcomes and generate plausible explanations related to the observations</li> </ul>	<b><u>DISCUSSION</u></b> <ul style="list-style-type: none"> <li>- Using the results obtained, you must identify any trends, patterns or relationships</li> <li>- You must explain your results and relate it to your research.</li> <li>- You must assess your investigation's accuracy, reliability and validity</li> <li>- You must identify the important applications of your scientific investigation</li> </ul>	<input type="checkbox"/>
Drawing valid conclusions from gathered data and information	<b><u>CONCLUSION</u></b> <ul style="list-style-type: none"> <li>- You must relate your results to your aim and hypothesis (was the hypothesis supported/rejected)</li> <li>- You must include a general overview of what you learned from completing your investigation</li> </ul>	<input type="checkbox"/>
Selecting and using appropriate formats to acknowledge sources of information	<b><u>REFERENCES</u></b> <ul style="list-style-type: none"> <li>- You must include at least two references that are written in Harvard style (<i>see student diary</i>)</li> </ul>	<input type="checkbox"/>
	<b><u>OTHER THINGS TO KEEP IN MIND</u></b> <i>Marks will also be awarded for the presentation of your investigation. Ensure that:</i> <ul style="list-style-type: none"> <li>- You have set out your investigation correctly and it is well-presented.</li> <li>- You have used concise English with appropriate scientific terminology</li> <li>- <b><i>YOUR HAVE READ AND CHECKED YOUR REPORT AGAINST THE SUCCESS CRITERIA</i></b></li> </ul>	<input type="checkbox"/>

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

**SUCCESS CRITERIA**

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

Element	Section	Indicators of Achievement	Marks Awarded
IS	Plan	<ul style="list-style-type: none"> <li>Appropriate title that describes the question under investigation</li> <li>States the question under investigation</li> <li>Outlines a strategy/steps required to design an investigation to answer the question</li> <li>Fair testing principles considered and demonstrated</li> <li>Materials needed are listed</li> <li>Prediction of investigation outcome made</li> <li>Results format planned and demonstrated</li> </ul>	5 4 3 2 1
CS	Introduction and title	<ul style="list-style-type: none"> <li>Identifies and presents information relevant to the problem</li> <li>Explains why the investigation is important/useful</li> <li>Writes a relevant title</li> </ul>	3 2 1
IS	Aim	<ul style="list-style-type: none"> <li>Aim is clear and well-written</li> </ul>	1
IS	Variables	<ul style="list-style-type: none"> <li>Identifies the experimental variables               <ul style="list-style-type: none"> <li>Independent</li> <li>Control</li> <li>Dependent</li> <li>Controlled</li> </ul> </li> </ul>	4 3 2 1
IS	Hypothesis	<ul style="list-style-type: none"> <li>Identifies and describes the problem in the form of a hypothesis</li> <li>Correctly uses variables in hypothesis</li> </ul>	2 1
IS	Risk Assessment	<ul style="list-style-type: none"> <li>Identifies any risks in undertaking the investigation</li> <li>Correctly outlines how these risks will be managed</li> </ul>	2 1
IS	Materials	<ul style="list-style-type: none"> <li>Lists equipment and/or resources required for the investigation</li> </ul>	2 1
IS	Method	<ul style="list-style-type: none"> <li>Correctly identifies risk prevention strategies and controls the variables that will be kept the same</li> <li>Method is written in steps and in past tense</li> <li>Method steps starts with a verb, no personal pronouns</li> <li>Describes the protocols used in detail</li> </ul>	3 2 1
CS	Results	<ul style="list-style-type: none"> <li>Results are appropriate for the investigation method (1)</li> <li>Results show repetition (1)</li> <li>Uses graphs/tables/databases/spreadsheets or flow charts to represent findings clearly and succinctly (2)</li> <li>Correct units for data. (1)</li> </ul>	5 4 3 2 1
IS	Evidence of Investigation	<ul style="list-style-type: none"> <li>Provides evidence that the investigation was conducted appropriately and as described in their report               <ul style="list-style-type: none"> <li>Photograph</li> </ul> </li> </ul>	4 3 2 1
CS	Discussion	<ul style="list-style-type: none"> <li>Identifies trends, patterns and relationships</li> <li>Explains a possible explanation for the results obtained</li> <li>Assesses the validity of the data</li> <li>Assesses the reliability of the data</li> <li>Assesses the accuracy of the data</li> <li>Identifies any problems encountered when completing the experiment</li> <li>Identifies areas for improvement</li> <li>Identifies application or impact of research</li> </ul>	8 7 6 5 4 3 2 1
IS	Conclusion	<ul style="list-style-type: none"> <li>Relates results to aim and hypothesis</li> <li>Makes a generalisation in relation to results</li> </ul>	2 1
CS	References	<ul style="list-style-type: none"> <li>Lists at least 2 references (2)</li> <li>References are written in an appropriate style (Harvard style) (1)</li> </ul>	3 2 1
CS	Presentation	<ul style="list-style-type: none"> <li>Report is neat and shows evidence of thought in its presentation</li> </ul>	2 1
CS	Language	<ul style="list-style-type: none"> <li>Written in clear concise English (correct spelling and grammar) (2)</li> <li>Appropriate scientific terminology is used throughout the investigation (2)</li> </ul>	4 3 2 1

REPORTING OUTCOMES	MARK	GRADE	FEEDBACK
Communicating Scientifically	/25		
Investigating Scientifically	/25		

# CONTRACT

## Scientific Investigation Project Student Contract

A compulsory part of the RoSA is the completion of a student research project. The purpose of the independent research project is to allow students to apply the skills they are learning and to develop these skills in an activity over an extended period of time. The project will take place over a 4 week period where some time in class will be devoted to help plan and clarify difficulties. It is mandatory the actual research and/or investigation be conducted outside of normal school hours.

Students need to work independently on the tasks away from the school environment.

Failure to complete and hand in the Student Research Project and its components by the due dates, could result in a failure to achieve all of the outcomes for the RoSA in Science. This could lead to an **'N' determination**.

Late submissions will result in a 0 mark as per the assessment policy unless acceptable documentation (e.g. medical certificate) is provided. In this instance, the assessment task must be submitted to the classroom teacher or head teacher of Science the next school day from the certificate date.

Submitted work must be an original piece and the result of the independent efforts of the student. Here are some examples of malpractice that are regarded as cheating

- giving false reasons for not handing in work by the due date
- handing in work that someone else did and presenting it as your own
- submitting work that someone else, like a parent, coach, tutor or subject expert, substantially contributed to
- copying an investigation from the internet
- using material directly from books, journals, CDs or the internet without giving its source
- making up information to complete the piece of work

Work deemed as a result of malpractice will result in an award of "zero" (0) marks.

After reading through this contract and the expectations for this project, please sign and return to your Science Teacher.

*Parents/Guardians: If you have any questions regarding this project, please do not hesitate to contact your child's teacher or the Head Teacher Science.*



### Student Contract and Parent Acknowledgement Slip

Student Name: ..... Student Signature: .....

Project title: .....

Due Date of Project: ..... Class: ..... Teacher: .....

(Please note that there are strict penalties for late assignments without medical certificates.)

Parent/Guardian Name:

.....

Parent/Guardian Signature: ..... Date: .....