Pimpama State School
2025 Science Fair Competition

Pimpama State School is once again holding a Science Fair Competition! This is a school wide competition where students are awarded prizes in each category. In order for students to enter the competition they may choose to complete a project in one of the five categories (outlined below and in this booklet). These entries will then be judged using an age-appropriate criteria and will all be proudly displayed at the Science Fair on **Friday the 22nd of August (Term 3, Week 6)** in the school hall.

Please note that although guidance can be given to children whilst undertaking work on their Science Fair entry, the work is to be completed by the student.

Following this event, student projects will be selected to gain entry into the 'Griffith University Gold Coast Science Competition' and then the 'Science Teachers Association of Queensland' (STAQ) Science Contest. Further to this, students who excel in these competitions can be selected as entrants to the 'BHP Billiton Science Awards'.

Students may choose from **any one** of the following categories which are outlined in this booklet:

- Environmental Action Project
- Communicating Science
- Engineering and Technology Projects
- Classified Collections
- Scientific Investigations

Please note: Every project submitted **must** be accompanied by a detailed scientific journal.

The age categories for entries are as follows: PREP, Years 1-2, Years 3-4, Years 5-6 (Students may work individually or in pairs).

**Please refer to the following websites if you are in need of *'ideas'* for a project:
https://www.sciencebuddies.org
http://www.sciencekids.co.nz
https://www.education.com/science-fair/

Important Dates to Remember!

To enable time to plan the Science Fair adequately, please advise your science teacher of the category in which you have chosen to undertake by **Friday 25th July.** If you have any queries or questions, please do not hesitate to contact your classroom teacher, Miss Lord (Prep- Year 2 STEM Teacher) Miss Denholm (Year 3- Year 6 Science Teacher) by email.

Miss Lord: klord21@eq.edu.au

Miss Denholm: akden0@eq.edu.au

Important Dates to Remember!!

Friday 25th July (week 2):	Advise your science teacher of the category for your project
Friday 15th August (week 5):	All projects are due at school
Friday 22nd August (week 6):	Pimpama State School Science Fair – (viewing and judging)
TBA:	Winners announced at Assembly and prizes given
Thursday 4th September:	Griffith University Gold Coast Science Competition Awards Night
TBA:	STAQ Science Competition

Extra information on Griffith University Gold Coast Science Competition and STAQ Science Contest can be found at:
https://app.griffith.edu.au/events/event/53747
http://www.staq.qld.edu.au/queensland-science-contest/

SCIENCE Fair Club

PIMPAMA STATE SCHOOL
PARTNERS IN EDUCATION

Need help with your project? Come to Science Fair Club

When? Monday 2nd break (Seniors) Thursday 1st break (Juniors)

Where? Science Room- Starting Term 2 STEM Room- Starting Term 3

Date of Science Fair:

Friday 22nd August
(week 6)

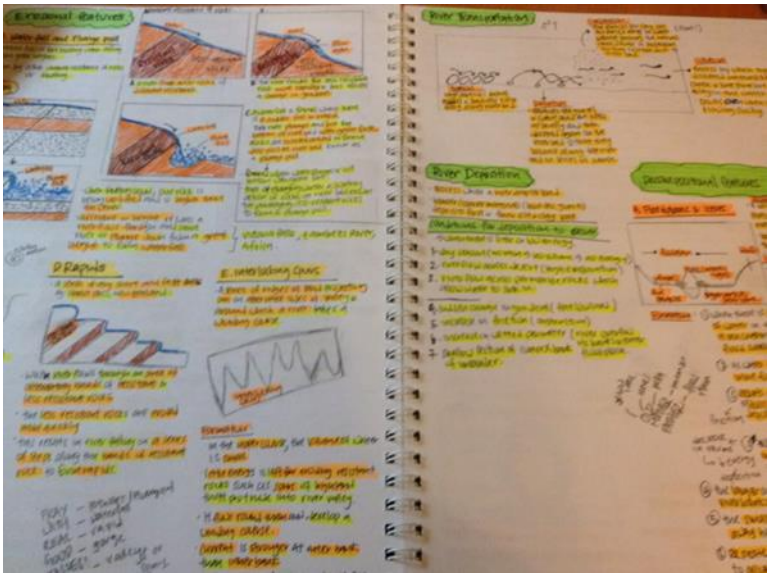
Projects due at school:

Friday 15th August
(week 5)

THE SCIENTIFIC JOURNAL

The Scientific Journal is **VERY IMPORTANT** in showing the purpose behind the study, and the way in which the question evolved and was tackled, as well as a **RECORD** of how the project progressed over time. A Scientific Journal helps you make sense of your science learning. **EVERY ENTRY MUST INCLUDE A SCIENTIFIC JOURNAL.**

The Scientific Journal should:

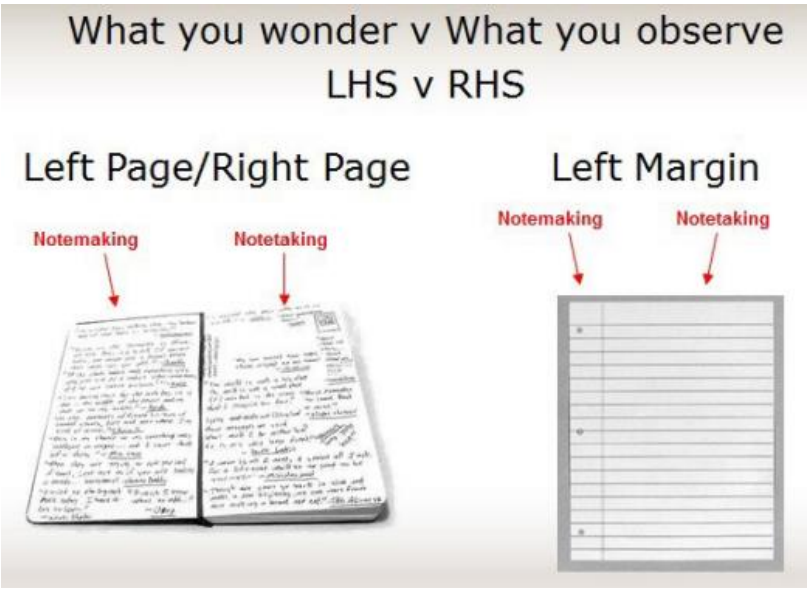


- Have a record of how your work progressed over time (including the disasters). The best projects engage the viewer (and judges) in the excitement and failures of the investigation! Don't forget to **DATE** your work.
- Contain evidence of scientific thought used. Any questions you have along the way or insights into the progress of your project.
- Be a series of handwritten or typed notes.
- Include photos, diagrams, etc. to record the process. Anything to explain what you have investigated. (Photos and drawings are a great idea for lower year levels.)
- Contain notes of your findings and a summary of what you have learnt/achieved as a result of your scientific work!
- Spelling should be checked for accuracy.
- Be presented in a neat and well-presented format.
- Acknowledge any assistance received from parents/teachers.

Note-taking and Note-making

You may like to use the Right-hand side (or pages) of your notebook to record investigations including: investigation question, prediction/hypothesis, method, materials, observations/measurements, labelled drawings, graphs, discussion, conclusions. This is **Note-taking**.

You may choose to use the Left-hand side (or pages) of your notebook to record your thoughts and reflections on what is happening or questions or ponderings or rough diagrams/sketches etc. This is called **Note-making**.



***IF YOU WOULD LIKE MORE EXAMPLES OF SCIENTIFIC JOURNALS, ASK YOUR SCIENCE TEACHER.**

OPTION ONE: ENVIRONMENTAL ACTION PROJECT

The Task:

To identify, research, investigate and present recommendations about a local environmental issue.

Some examples of local action projects:

Green Power	Rainwater Harvesting	Energy Conservation
Recycling	Pollution	Soil Quality
Greenhouse Effect	Organic Garden	Air Quality
Renewable Energy	Water Purification	Waste Management

What to do:

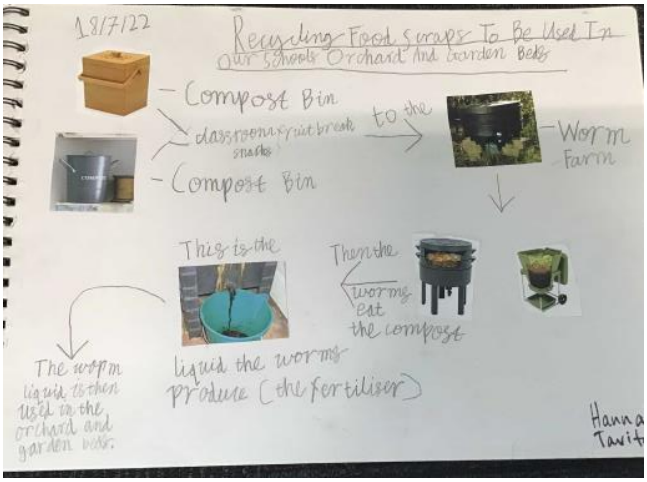
- Identify and research a local environmental issue.
- With the help of people in the community, set about investigating and resolving the problem.
- Choose the way you will present your project e.g. poster or report.
- Provide recommendations for future action.
- Keep a day-by-day Scientific Journal that explains what you do and why.

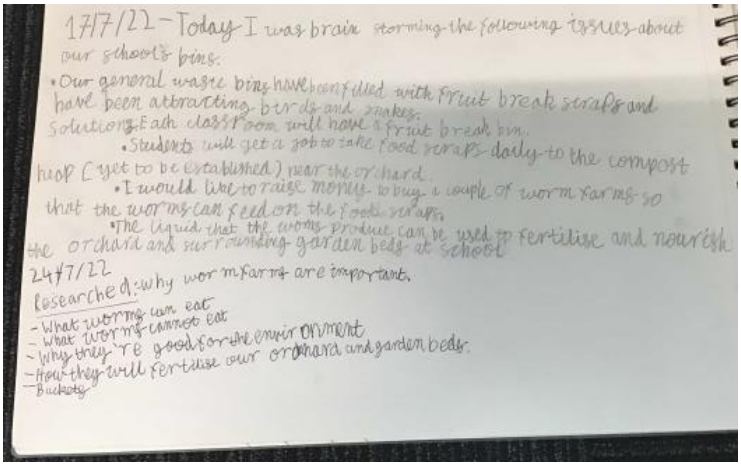
What makes a winning entry:

RELEVANCE OF TOPIC	Topic chosen is ***original and relevant.*** Demonstrates a ***creative approach*** to ***solving*** an environmental problem. ***Relevance*** to the broader community is ***clearly articulated***.
SCIENTIFIC RESEARCH	***Evidence of scientific research*** such as: Collection of data/information about the existing problem is provided and is age appropriate. ***Explains*** how the issue links to scientific knowledge and understanding.
DISCUSSION	***Shows a clear understanding*** of a **LOCAL** environmental issue. For example: *What is the problem? What are the reasons that an action plan is required?* ***Evidence of consultation*** with the community about the issue is shared to set up the action plan. For example: *emails, letters, interviews, survey or questionnaire.* ***Presentation*** of the data collected. For example: *tables or graphs.* Shows a ***clear understanding*** of the ***environmental issue*** with a ***concise action plan*** to help ***resolve the issue*** identified. ***Identifies a possible solution/s*** to the issue.
CONCLUSION	Clear ***explanation*** of: *- how the action plan has addressed the problem* *- ways in which the outcomes reflect the original aims for the action project*
SCIENTIFIC JOURNAL	***Records*** the problem and actions of the project. ***Accurate/ detailed notes of findings***, decisions and thought processes are evident. For example: *brainstorming matrix, diagrams, lists.*
SCIENTIFIC LITERACY	Appropriate ***use of scientific language*** and ***accurate*** spelling and grammar.

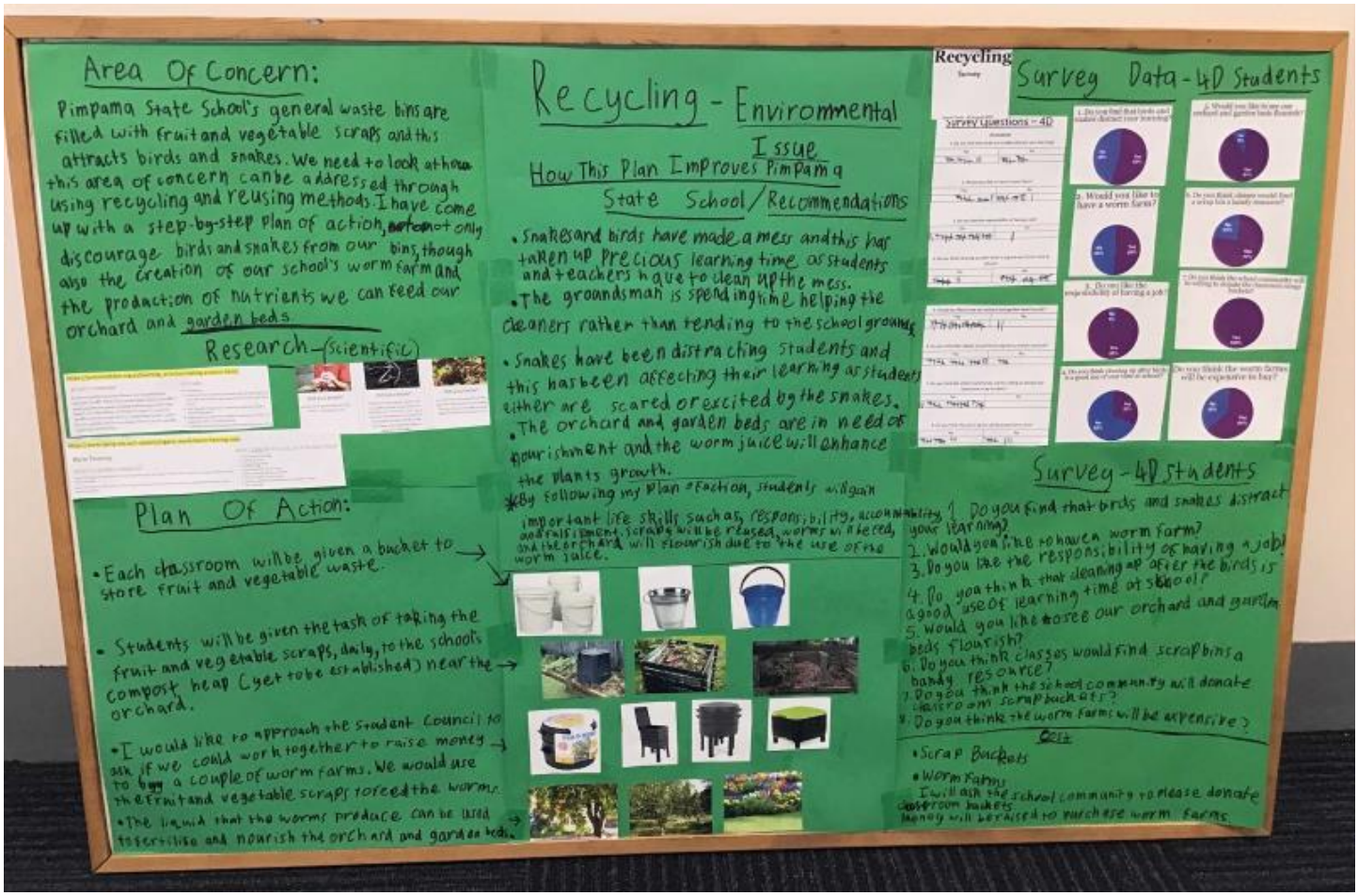
OPTION ONE: ENVIRONMENTAL ACTION PROJECT (EXAMPLE)

Scientific Journal

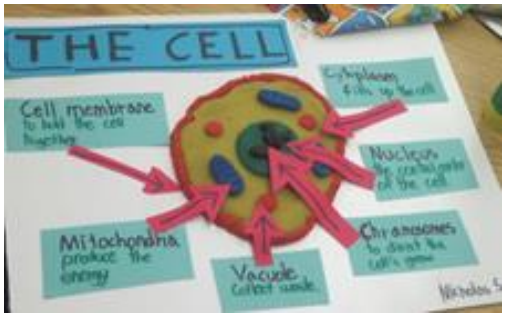




Presentation of Data



OPTION TWO: COMMUNICATING SCIENCE



The Task:

To explain and communicate information about a scientific concept to a specified audience.

What to do:

- Present a scientific concept using a communication medium (Model, Poster, PowerPoint Presentation, Game, Comic Strip).
- Include a written report (see below)
- Keep a day-by-day Scientific Journal that explains what you do and why.

Your written report should:

- Clearly & briefly explain the scientific concept you have chosen.
- Include your background research information, references and permission to use copyrighted material (if applicable).
- Identify and describe the target audience (examples could be: preschool students, aged pensioners without a scientific background, the general community).
- Justify your choice of communication medium for your target audience.
- Choice of Communication Mode.

Model

- 3D representation of a scientific concept including title, labels
- Not exceed 600mmH x 500mmD x 600mmW (Height x Depth x Width)
- Original construction

Cartoon/Comic Strip

- A single or series of cartoons which are hand drawn or computer generated which communicate a scientific concept.
- The presentation must not exceed an A1 size (600mm x 840mm).
- The cartoons/images must not be subject to copyright or a letter stating that you have received permission to use the work.
- The comic strip must be an original piece of work.

Game

- The game may be a board or a computer-generated game which communicates a scientific concept.
- The game must be an original piece of work.
- Clear Instructions must be included.

Poster

- A single or series of diagrams/paintings/drawings with text which communicates a scientific concept.
- The poster must be “flat” or 2D two dimensional.
- The presentation must not exceed 850mm x 1200mm.
- The images must not be subject to copyright or a letter stating that you have received permission to use the work.
- The presentation must be an original piece of work.

PowerPoint Presentation

- A series of slides with/without sound which communicates a scientific concept – with paper printout of slides.
- The presentation must be an original piece of work.
- The images must not be subject to copyright or a letter stating that you have received permission to use the work.

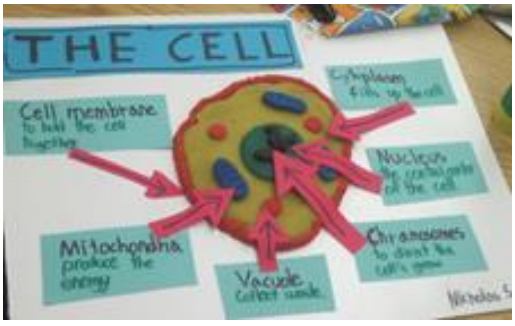
Multi-media Presentation

- A visual media presentation which communicates a scientific principle.
- The presentation must be an original piece of work not longer than 2 minutes.
- The images must not be subject to copyright otherwise a letter stating that you have received permission to use the work.

What makes a winning entry:

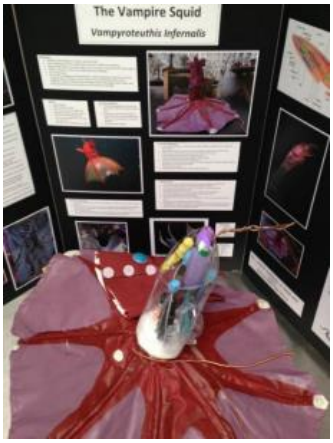
RELEVANCE OF TOPIC	Topic chosen is ***original*** and ***relevant***. ***Importance*** to the broader community has been clearly expressed. The topic choice has been clearly ***explained*** and/or ***justified*** with reasoning for its selection.
SCIENTIFIC RESEARCH	***Background research*** information is evident to support the topic choice. There is ***evidence*** of the application of science knowledge to effectively communicate the scientific concept. It is ***age appropriate*** for the audience intended.
AUDIENCE	Provides a ***clear explanation*** of ***intended audience.*** ***Explanation*** of how the communication medium is suited to the identified target audience is ***evident*** and ***justified***.
COMMUNICATION	Communication is ***succinct*** and ***effective*** for the identified audience. Demonstrates an ***original*** and ***creative*** approach to solving the problem showing originality. Represents and ***communicates observations***, ideas and findings using ***formal*** and ***informal*** representations. ***Visually appealing*** and effective use of design principles for the selected medium. ***Meets specifications*** for the category – *cartoon/comic strip; game; poster; PowerPoint presentation; website or model or video.*
OVERALL PRESENTATION	Presentation is ***informative*** Presentation is ***entertaining/visually appealing*** Presentation is effective and ***clearly articulated***
SCIENTIFIC JOURNAL	Notebook contains ***evidence of scientific thought***. ***Accurate/ detailed notes*** of findings, decisions and thought processes are evident.
SCIENTIFIC LITERACY	Appropriate ***use of scientific language*** and ***accurate*** spelling and grammar.

OPTION TWO: COMMUNICATING SCIENCE (EXAMPLE)



Poster

Model



Game

OPTION THREE: SCIENTIFIC INVESTIGATIONS

This category is eligible for the STAQ (Science Teachers Association of QLD) Science competition with pathways to the BHP Billiton Science and Engineering Awards.

The Task:

- Design and perform a scientific investigation and report on the results obtained and the conclusions reached.

What to do:

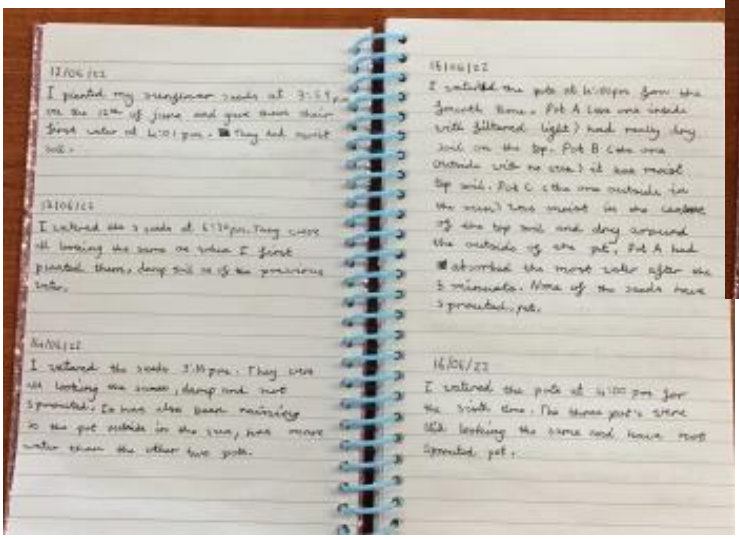
- Choose a topic, there are no restrictions.
- Keep a day-by-day Scientific Journal that explains what you do and why.
- Ask questions about your topic.
- Collect the necessary background information about your topic.
- Design and perform one or more experiments that will make up the investigation.
- Analyse the results and draw your conclusions.
- Present a report to tell others what you did and what you found out.
- Include any references and acknowledge the assistance you receive.

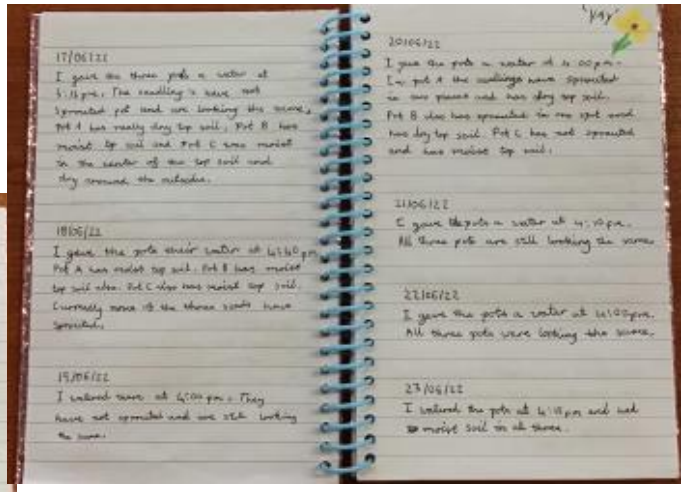
What makes a winning entry:

RELEVANCE OF TOPIC	***Reason why this topic was chosen*** are detailed. Topic chosen is ***original and relevant.*** ***Focus question is testable.*** The investigation is an ***original*** and ***creative*** approach to solving a problem.
SCIENTIFIC RESEARCH	***Evidence*** of scientific research. Background research is ***sufficient*** and ***relevant***.
EXPERIMENTAL DESIGN	A clear ***predication/hypothesis*** has been made. ***Equipment*** has been listed. Investigation contains elements of a ***fair test.*** ***Variables are identified*** (independent, dependant, controlled and monitored) and ***described***. ***Method*** allows for collection of sufficient relevant data. Steps have been clearly outlined. ***Safety decisions*** have been considered. ***Identification/Discussion*** of any ***errors/problems*** experienced during the investigation has been included. For example: *If I did this again…., I repeated the process because..., I observed that…*
DATA	***Sufficient relevant data*** has been collected. Data is ***displayed*** appropriately to present findings. For example : *graphs, tables, photos, drawings, etc.*
CONCLUSION	Wrote a conclusion that discusses the ***key findings*** of the investigation. For example: *Was the initial prediction/ hypotheses achieved? Why/why not?*
SCIENTIFIC JOURNAL	Notebook ***contains evidence of scientific thought***. ***Accurate/ detailed notes*** of findings, decisions and thought processes are evident.
SCIENTIFIC LITERACY	Appropriate ***use of scientific language*** and ***accurate*** spelling and grammar.

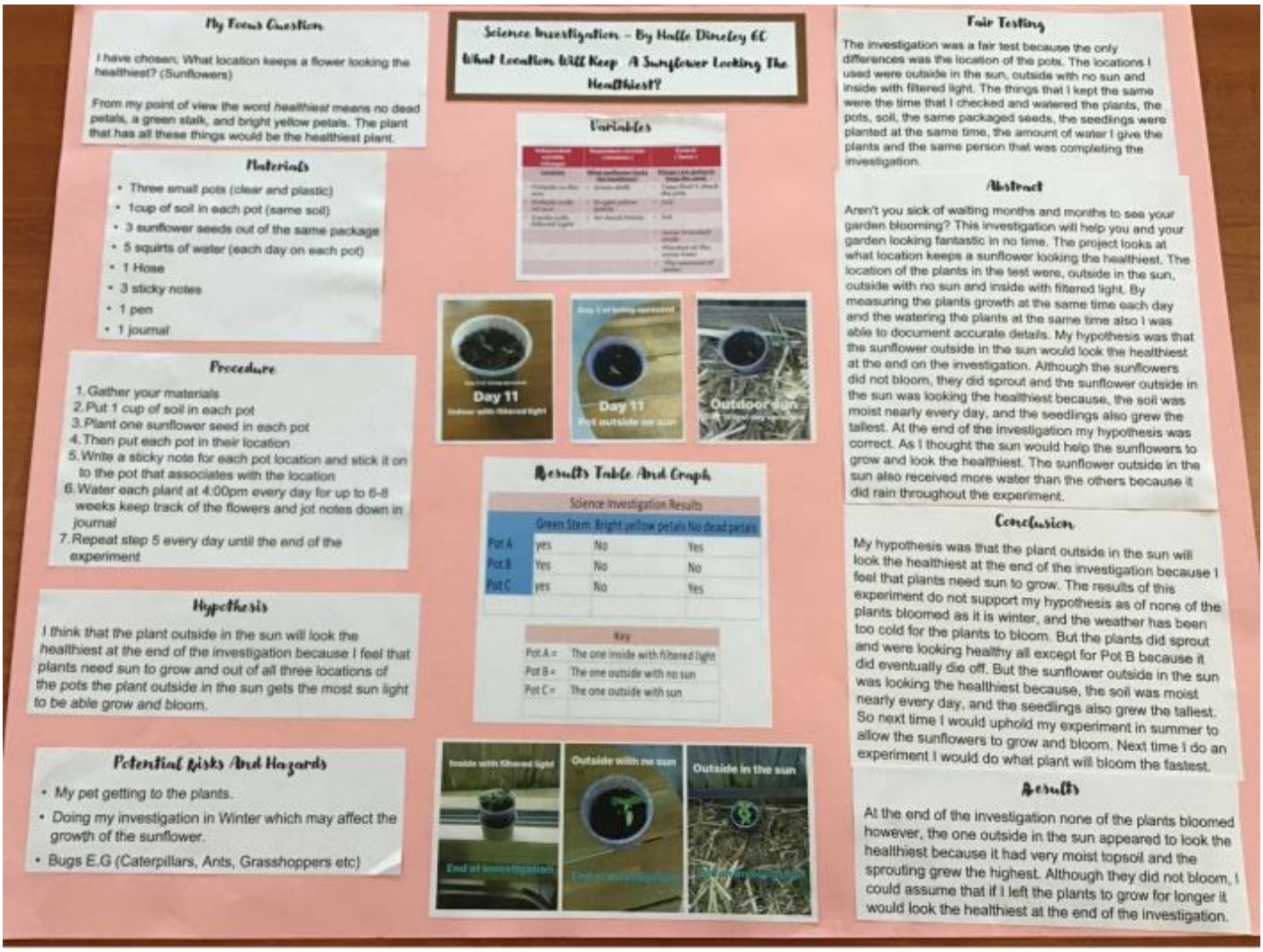
OPTION THREE: SCIENTIFIC INVESTIGATIONS (EXAMPLE)

SCIENTIFIC JOURNAL





Presentation of Data/Investigation



My Focus Question

I have chosen; What location keeps a flower looking the healthiest? (Sunflowers)

From my point of view the word *healthiest* means no dead petals, a green stalk, and bright yellow petals. The plant that has all these things would be the healthiest plant.

Science Investigation – By Halle Directey 6C

What Location Will Keep A Sunflower Looking The Healthiest?

Fair Testing

The investigation was a fair test because the only differences was the location of the pots. The locations I used were outside in the sun, outside with no sun and inside with filtered light. The things that I kept the same were the time that I checked and watered the plants, the pots, soil, the same packaged seeds, the seedlings were planted at the same time, the amount of water I give the plants and the same person that was completing the investigation.

Materials

- Three small pots (clear and plastic)
- 1cup of soil in each pot (same soil)
- 3 sunflower seeds out of the same package
- 5 squirts of water (each day on each pot)
- 1 Hose
- 3 sticky notes
- 1 pen
- 1 journal

Variables

Abstract

Aren't you sick of waiting months and months to see your garden blooming? This investigation will help you and your garden looking fantastic in no time. The project looks at what location keeps a sunflower looking the healthiest. The location of the plants in the test were, outside in the sun, outside with no sun and inside with filtered light. By measuring the plants growth at the same time each day and the watering the plants at the same time also I was able to document accurate details. My hypothesis was that the sunflower outside in the sun would look the healthiest at the end on the investigation. Although the sunflowers did not bloom, they did sprout and the sunflower outside in the sun was looking the healthiest because, the soil was moist nearly every day, and the seedlings also grew the tallest. At the end of the investigation my hypothesis was correct. As I thought the sun would help the sunflowers to grow and look the healthiest. The sunflower outside in the sun also received more water than the others because it did rain throughout the experiment.

Procedure

1. Gather your materials
2. Put 1 cup of soil in each pot
3. Plant one sunflower seed in each pot
4. Then put each pot in their location
5. Write a sticky note for each pot location and stick it on to the pot that associates with the location
6. Water each plant at 4:00pm every day for up to 6-8 weeks keep track of the flowers and jot notes down in journal
7. Repeat step 5 every day until the end of the experiment

Results Table And Graph

Science Investigation Results			
	Green Stem	Bright yellow petals	No dead petals
Pot A	yes	No	Yes
Pot B	Yes	No	No
Pot C	yes	No	Yes

Key	
Pot A =	The one inside with filtered light
Pot B =	The one outside with no sun
Pot C =	The one outside with sun

Conclusion

My hypothesis was that the plant outside in the sun will look the healthiest at the end of the investigation because I feel that plants need sun to grow. The results of this experiment do not support my hypothesis as of none of the plants bloomed as it is winter, and the weather has been too cold for the plants to bloom. But the plants did sprout and were looking healthy all except for Pot B because it did eventually die off. But the sunflower outside in the sun was looking the healthiest because, the soil was moist nearly every day, and the seedlings also grew the tallest. So next time I would uphold my experiment in summer to allow the sunflowers to grow and bloom. Next time I do an experiment I would do what plant will bloom the fastest.

Hypothesis

I think that the plant outside in the sun will look the healthiest at the end of the investigation because I feel that plants need sun to grow and out of all three locations of the pots the plant outside in the sun gets the most sun light to be able grow and bloom.

Potential Risks And Hazards

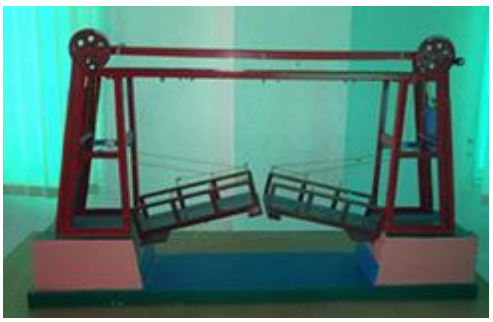
- My pet getting to the plants.
- Doing my investigation in Winter which may affect the growth of the sunflower.
- Bugs E.G (Caterpillars, Ants, Grasshoppers etc)

Results

At the end of the investigation none of the plants bloomed however, the one outside in the sun appeared to look the healthiest because it had very moist topsoil and the sprouting grew the highest. Although they did not bloom, I could assume that if I left the plants to grow for longer it would look the healthiest at the end of the investigation.

OPTION FOUR: ENGINEERING AND TECHNOLOGY PROJECTS

This category is eligible for the STAQ (Science Teachers Association of QLD) Science competition with pathways to the BHP Billiton Science and Engineering Awards.



The Task

To design and then create a device or product to demonstrate a scientific principle, solve a problem or offer a different approach to a problem.

What to do:

- The entry must be a physical device or product with dimensions not exceeding 76cm in depth, 122cm in width and 100cm in height. (Please note: these dimensions only are required to be adhered to if you wish to be considered for other external competitions).
- The project must satisfy one of the following:
    - Demonstrate a scientific problem;
    - Solve a problem; or
    - Offer a different approach to a problem.
- Provide a report clearly explaining how the model works or will work and what it does.
- Provide details on why you chose the problem and how it is relevant or important.
- Test your model and include test results.
- Reflect on how your model solves the problem.
- Keep a day-by-day Scientific Journal that explains what you do and why.

What makes a winning entry:

DEFINE	Project **defines/outlines** a problem to be solved.
GOAL	Practical ***goals/aims for the device/product*** are provided. Explanation has been provided on how the device/product demonstrates a scientific principle, solves a problem or offers a different and new approach to a problem.
DESIGN IDEAS	Evidence provided of the ***initial design ideas*** for the device/product. Shown via note-taking, diagrams, research provided, surveys etc.
PLAN	Evidence of ***a plan*** to solve the initial problem is provided. Written processes, labelled diagrams, visual representations.
SAFETY	Consideration of ways in which ***safety*** has been considered in the designing/creation of the prototype has been provided.
MATERIALS	List of ***materials*** has been provided.
CONSTRUCTION	The ***construction process*** has been clearly outlined and age appropriate.
TESTING PROCESS	Description or visual evidence of the ***testing process*** for the prototype has been provided. For example: *surveys, tables, graphs, photo evidence/captions.*
SUCCESSES AND FAILURES	Outline of ***the successes and the failures*** has been provided. Suggestions for improvements have been included.
CONSIDERATIONS AND CHANGES	***Considerations and changes*** to the prototype have been recorded and implemented.

FINAL DESIGN	Evidence of ***the final design*** is shared. The product should be well made and easy to use. It should have dimensions not exceeding 76cm in depth, 122cm in width and 100cm in height)
SCIENTIFIC JOURNAL AND PRESENTATION	***Scientific Journal*** including all of the above information has been included. Accompanied with a ***1-5 min presentation*** of the device/product in operation.

OPTION FOUR: ENGINEERING AND TECHNOLOGY PROJECTS (EXAMPLE)

Product/Prototype

OPTION FIVE: CLASSIFIED COLLECTIONS

The Task:

To compile and present a scientific classified collection to show relationships between the items in the collection, or to assist in their recognition. Classified collection examples include a collection of specimens of plants, rocks, insects, shells etc.

What to do:

- Plan, collect, classify and display/organise specimens of a collection to:
    - Help in the understanding of the material that is being collected

      or

    - Help in the solution of some other problem
- Explain how they have classified the collection using a specific legend or key and an explanation in their notebook about it.
- Keep a day-by-day Scientific Journal that explains what you do and why.

A guide to collecting in different fields of natural science:

<u>Botany</u>

A classified plant collection might deal with a group of plants (e.g. ferns, conifers, palms, grasses, eucalypts, wattles), it might be the flowers of plants that are found in a particular area, or it might be a collection classified according to leaf shapes, flower or fruit characters, or chemical components (aromatic leaves), or it may be for a purpose such as identifying weeds in a locality. In these cases, it is important to explain why the collection was undertaken, and to show how the classification was developed.

- Use the new Griffith University "Grows at Griffith" App to assist you to identify your plant species - it provides plant family name, scientific name, location, distribution and other interesting details.
- A collection of seeds might investigate the relationships between seed composition (carbohydrate, protein, fat) and taxonomic group, or between seed size and plant habit (food plant, weed, and forest plant).
- A collection of weeds would ideally include some information that assisted in their identification (a key of some sort as discussed below), and comments on issues such as their importance, origin, manner of spread and difficulty of control.
- A collection of herbs might examine how they are distributed between families of plants, their regions of origin, and how they are used (directly or after processing).
- How to preserve plant specimens:
    - Choose specimens that contain stem, leaf, flowers, fruit/nut, seeds if possible.
    - Layout newspaper (greater than the size of specimen), add 2 layers of paper towel, place specimen on paper towel, add 2 more layers of paper towel, then a layer of newspaper; continue process with the next specimen; press specimens by placing in a flower press or by placing a heavy object on top e.g. Books; change paper towel and paper daily; continue for 1-2 weeks.
- Display specimens with a label: with common name, scientific name, date of collection, location of collection.

<u>Geology</u>

A classified geological collection becomes more valuable when the relationships between rock types are examined, or when the collection is assembled to assist in the identification of rocks or minerals. Relationships between rock types may be examined on a local or a larger scale, but there should be a question asked concerning these relationships. An assemblage of rock types for identification should concentrate either on a class of rocks or on minerals that are important in a locality or region (e.g. important commercial minerals).

- Display specimens with a label: e.g. Identification, date of collection, location of collection

<u>Entomology</u>

A classified insect collection might concentrate on the insects occurring in a backyard over a period of time, or it might concentrate on a particular group of insects that can be collected from a region, or it might survey the orders of insects that can

be collected in a region. The purpose for the collection should be to increase understanding of insects, and this purpose should be made clear in the Scientific Journal.

- Displaying specimens:
  - See Queensland Museum website for preservation & pinning methods
  - Keep display enclosed with moth balls
  - Labelling: Identification, date of collection, location of collection

Zoology

A classified collection of animals (other than insects) will usually be of durable discarded parts (shells or feathers). Shells are used to identify some invertebrates, so the taxonomic relationships may be examined at a number of scales of organisation. Feathers are attractive, but the purpose of collecting and classifying should be more than to simply gather and arrange. There may be an opportunity to examine the relationship between feather size and bird size, or habitat (for example, is it possible to show that water birds have different feathers from land birds?), so there is a question behind the collection.

- Display specimens with a label: e.g. Identification, date of collection, location of collection

IMPORTANT!

Protected Species

Be aware that there are a number of protected species and protected areas in Queensland where collecting is prohibited. They are protected because they are valuable or vulnerable. Ensure that collected specimens are not listed by the Department of Environment and Heritage Protection or collected from a protected area. Go to:
http://www.ehp.qld.gov.au/wildlife/threatened-species/

What makes a winning entry:

SPECIMEN COLLECTION	Demonstrates ***an original, clear and creative approach*** to the choice of specimens and their display.
COLLECTION CLASSIFICATION	Appropriate ***classification system*** is evident and used which shows the relationships between items. An appropriate ***table of characteristics*** or ***key*** is used for classification. Includes a ***scientific description*** of the classification system used and ***why it was chosen***.
CLASSIFICATION DISPLAY	Specimens are ***preserved*** and ***displayed*** suitably. Specimens are ***labelled correctly.***
CLASSIFICATION RESEARCH	Evidence of ***scientific research*** and ***background research*** is ***sufficient*** and ***relevant.***
SCIENTIFIC RELEVANCE	Collection is ***scientifically relevant*** with ***relationships clearly evident***.
SCIENTIFIC JOURNAL	Journal contains ***evidence of scientific thought***. **Accurate/detailed notes** of findings, decisions and thought processes are evident.
SCIENTIFIC LITERACY	Appropriate ***use of scientific language*** and ***accurate*** spelling and grammar.

OPTION FIVE: CLASSIFIED COLLECTIONS (EXAMPLE)