GOLD COAST SCHOOLS SCIENCE COMPETITION

Open to all state, independent and catholic primary and secondary schools in South East Queensland and Northern New South Wales.

26–29 August 2019

Science on the GO!
Griffith University Science Outreach Program

Queensland Government

Griffith UNIVERSITY

GRIFFITH UNIVERSITY
GOLD COAST SCIENCE COMPETITION

When 26 August – 29 August, 2019

Where Queensland Academies - Health Sciences campus (QAHS)

102 Edmund Rice Drive
Southport, QLD, 4125

Deliveries received Monday 26 August - 7.30am to 3pm to QAHS Science Lab
(QAHS Level 1 Science Lab C24.5 –Information Services and Learning Centre)

Judging Monday 26 August - 4.00pm until finish (7pm)
(QAHS, Level 1 Science Lab C24.5 –Information Services and Learning Centre)

Notification of Winners Tuesday 27 August & Wednesday 28 August

Open for viewing Thursday 29 August - 3.00pm to 6.00pm

Awards Ceremony Thursday 29 August at 6.00pm, QAHS Lecture Theatre

Collection/Pickup & take home of Entries - After Awards Ceremony on Thursday 29 August or Monday 2 September – 8:30am to 2.30pm

Categories

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

2019 Divisions

Prep
Years 1-2
Years 3-4
Years 5-6
Years 7-8
Years 9-10
Years 11-12

Students may work individually or in pairs

Registration & Payment

- Registrations open online approx. 1 month prior.
- Register online at www.griffith.edu.au/science-competition
- Only entries that are registered online will be judged
- Previously entered projects (from 2018 or earlier) will not be judged
- $5.00 per entry –
  An invoice will be sent to schools with registered entries once registrations have been finalised
- During the registration process, each registered school must nominate **at least 1 judge for the judging on 26 August** (4pm until finish) at the QAHS

Conditions of Entry:

Every registered entry must:

- include a signed statement by the teacher confirming 100% child's work (See Appendix 1)
- include a scientific notebook (reflective journal) (See Appendix 2)
- be identified with a label with the following details (see diagram below):
  - **Student Name/s**
  - **School**
  - **Registration Number (provided upon registration)**
  - **Division (please see page 2)**
  - **Category**
  - **Title**
  - If multiple parts label each part eg Part 1 of 2

Part _____ of _____

Name:

School:

Division: **Prep | Yrs. 1-2 | Yrs. 3-4 | Yrs. 5-6 | Yrs. 7-8 | Yrs. 9-10 | Yrs. 11-12**

Category:

Title:

FOR FURTHER INFORMATION

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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 Notebook that explains what you do and why (see Appendix 2) Students may work individually or in pairs.
- 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.
- Scientific Notebook (see Appendix 2).

What makes a winning entry?

RELEVANCE OF TOPIC	Topic chosen is original and relevant
	Focus question is testable
SCIENTIFIC RESEARCH	Evidence of scientific research
	Background research is sufficient and relevant
EXPERIMENTAL DESIGN	Investigation contains elements of a fair test
	Variables are identified (independent, dependant, controlled and monitored)
	Effective controlling and monitoring of variables
	Method allows for collection of sufficient relevant data
	Safety and ethical issues are considered
DATA	Sufficient relevant data is collected
	Data is displayed appropriately to present findings
CONCLUSION	Conclusion is made
	Conclusion is supported with evidence and scientific reasoning
NOTEBOOK	Notebook contains evidence of scientific thought
	Accurate/ detailed notes of findings, decisions and thought processes are evident
SCIENTIFIC LITERACY	Appropriate use of scientific language
	Required elements of a Scientific Report are included
	Sources have been cited

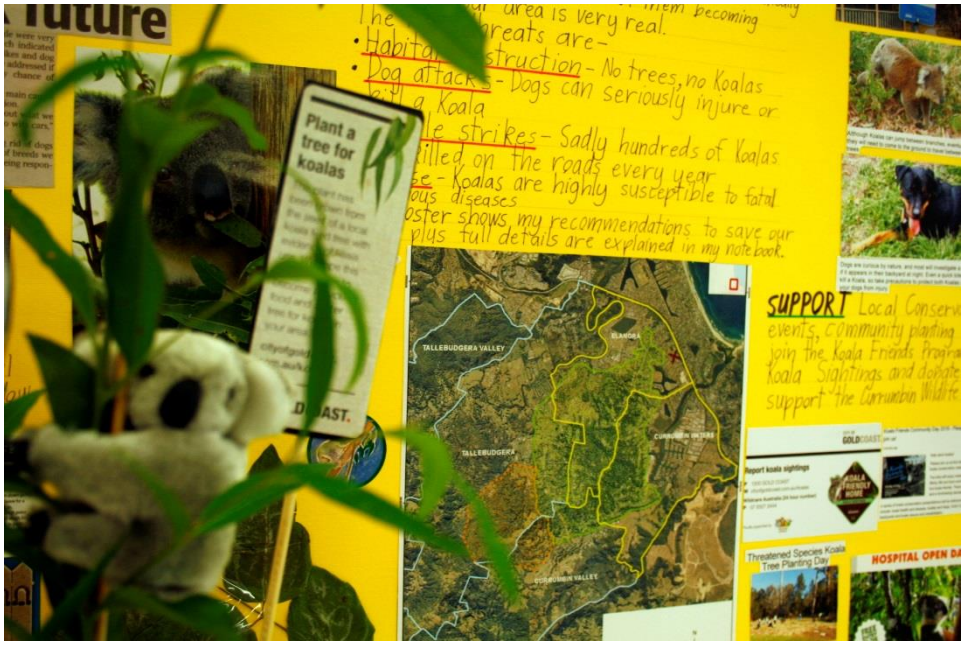
ENVIRONMENTAL ACTION PROJECT

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
- Climate change
- Air Quality
- Recycling
- Renewable Energy
- Water Purification
- Waste Management
- Balanced Ecosystem
- Organic Garden



What to do

- Identify and research a local environmental issue. Students may work individually or in pairs.
- With the help of people in the community, set about investigating and resolving the problem
- Choose the medium to present your project e.g. poster or report.
- Provide recommendations for future action
- Scientific Notebook (see Appendix 2)

What makes a winning entry?

RELEVANCE OF TOPIC	Topic chosen is original and relevant
	Relevance to the broader community is clearly articulated
SCIENTIFIC RESEARCH	Evidence of scientific research
DISCUSSION	Shows a clear understanding of the environmental issue
	Identifies a possible solution to the issue
CONCLUSION	Conclusion is made
	Conclusion is supported with evidence and scientific reasoning
NOTEBOOK	Notebook contains evidence of scientific thought
	Accurate/ detailed notes of findings, decisions and thought processes are evident
SCIENTIFIC LITERACY	Appropriate use of scientific language
	Sources have been cited

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

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.***
Adhering to the following criteria will ensure that entries are eligible to progress to the BHP Billiton Awards if selected:
The entry :

- must not be static except for new devices or products
- must satisfy one of the following:
  - Demonstrate a scientific principle;
  - Solve a problem; or
  - Offer a different approach to a problem
- must be accompanied by a Scientific Notebook (see Appendix 2) Students may work individually or in pairs.

Entries that make use of 240v power must be accompanied by a signed note of compliance as being supervised during the construction and testing by an appropriately qualified person.

Although some of the following may be used in the development phases they will not be accepted as part of the display:

1) Living organisms, including plants

2) Soil, sand, rock, and/or waste samples, even if permanently encased in a slab of acrylic

3) Taxidermy specimens or parts

4) Preserved vertebrate or invertebrate animals

5) Human or animal food

6) Human/animal parts or body fluids (for example, blood, urine)

7) Plant materials (living, dead, or preserved) that are in their raw, unprocessed, or non-manufactured state

8) All chemicals including water (Projects may not use water in any form in a demonstration)

9) All hazardous substances or devices (eg. poisons, drugs, firearms, weapons, ammunition, reloading devices, and lasers)

10) Dry ice or other sublimating solids

11) Sharp items (for example, syringes, needles, pipettes, knives)

12) Flames or highly flammable materials

13) Batteries with open-top cells

14) Glass or glass objects

15) Any apparatus deemed unsafe by the coordinator or judges (for example, large vacuum tubes or dangerous ray-generating devices, empty tanks that previously contained combustible liquids or gases, pressurized tanks, etc.)

What makes a winning entry?

RELEVANCE OF DEVICE/PRODUCT	The device/product demonstrates a scientific principle, solves a problem or offers a different approach to a problem
	Device/product is innovative
	Device/product has real life application
SCIENTIFIC RESEARCH	Evidence of scientific research
DEVICE/PRODUCT DESIGN	Device/product is well designed
	Device product is well constructed
	Device /product fits within the prescribed dimensions (76cm deep, 122cm width, 100cm height)
	Method allows for collection of sufficient relevant data
	Safety and ethical issues are considered
DISCUSSION	Applications of the device/product are evaluated
	Benefits to future society are clearly outlined
NOTEBOOK	Notebook contains evidence of scientific thought
	Accurate/ detailed notes of findings, decisions and thought processes are evident
SCIENTIFIC LITERACY	Appropriate use of scientific language
	Sources have been cited

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.
  - Scientific Notebook (See Appendix 2) Students may work individually or in pairs.

A guide to collecting in different fields of natural science:

Botany

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 eg. 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.

Geology

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

Entomology

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 Notebook.

- **Displaying specimens**:
  - See Queensland Museum website for **preservation & pinning** methods: http://www.qm.qld.gov.au/microsites/wild/pdf/Preserving-Pinning-Insects-Handout.pdf
  - Keep display **enclosed** with moth balls
  - **Labelling**: e.g. 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	Variety of specimens
COLLECTION CLASSIFICATION	Appropriate classification system is evident and used
	An appropriate table of characteristics or key is used for classification
	Includes a description of the classification system used and why it was chosen
CLASSIFICATION DISPLAY	Specimens are preserved and displayed appropriately
	Specimens are labelled appropriately
CLASSIFICATION RESEARCH	Evidence of scientific research
	Background research is sufficient and relevant
SCIENTIFIC RELEVANCE	Collection is scientifically relevant with relationships clearly evident
NOTEBOOK	Notebook contains evidence of scientific thought
	Accurate/ detailed notes of findings, decisions and thought processes are evident
SCIENTIFIC LITERACY	Appropriate use of scientific language Sources have been cited

COMMUNICATING SCIENCE

The Task:

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

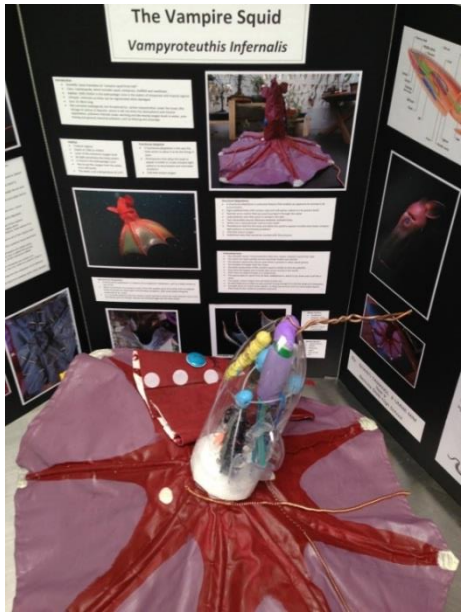
What to do:

- Present a scientific concept using a communication medium (Model, Poster, PowerPoint Presentation, Game, Comic Strip). Students may work individually or in pairs.
- Scientific Notebook (see Appendix 2)
- Written report (see below)

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

Choices of Communication Mode



Model

- 3D representation of a scientific concept including title, labels
- Not exceed 600mmH x 500mmD x 600mmW (HeightxDepthxWidth)
- 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

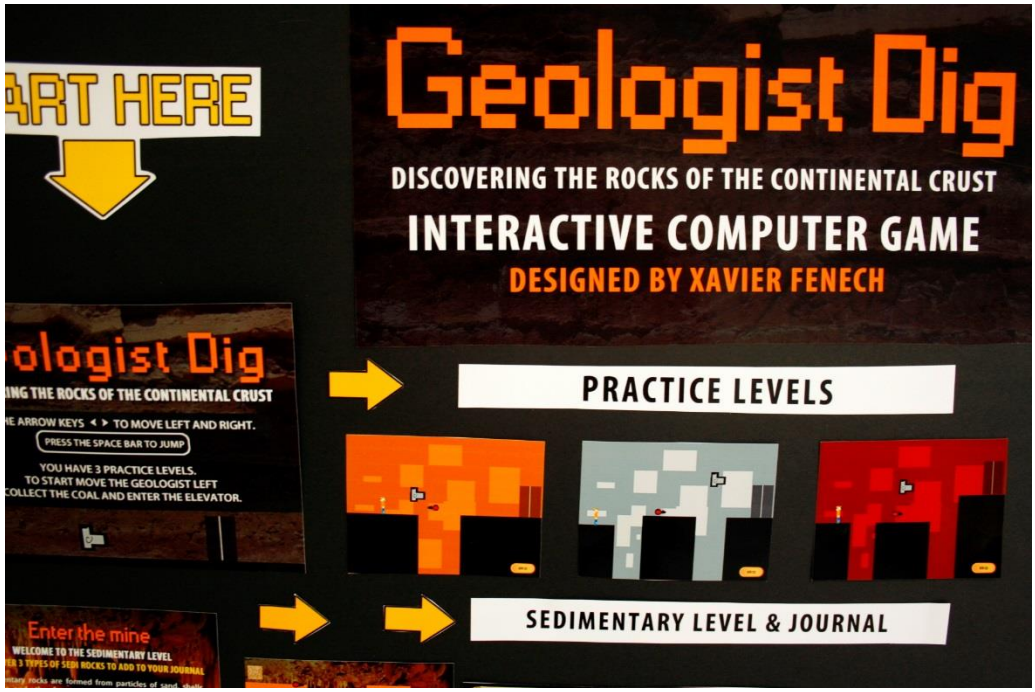
- A series of slides with/without sound which communicates a scientific concept – with paper printout of slides
- The presentation must be an original piece of work.
- The images must not be subject to copyright or a letter stating that you have received permission to use the work

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
	Relevance to the broader community is clearly articulated
SCIENTIFIC RESEARCH	Evidence of scientific research
AUDIENCE	Clear explanation of intended audience
	Communication is appropriate for the intended audience
COMMUNICATION	Communication is concise and effective for the identified audience
OVERALL PRESENTATION	Presentation is informative
	Presentation is entertaining
	Presentation is effective and clearly articulated
NOTEBOOK	Notebook contains evidence of scientific thought
	Accurate/ detailed notes of findings, decisions and thought processes are evident
SCIENTIFIC LITERACY	Appropriate use of scientific language
	Handbook guidelines have been followed
	Sources have been cited



APPENDIX 1
GOLD COAST SCIENCE COMPETITION 2019
STUDENT WORK AUTHENTICATION LETTER

The following letter must be submitted for each registered entry into the competition, signed & dated by student/parent and teacher.

Student Name:

School:

Division:

Category:

Project:

Title:

Dear Competition Judges,

By signing this document, I declare that the work submitted as an entry in the Gold Coast Science Competition is my own work. I have not previously submitted all or part of this work in previous Gold Coast Science Competitions.

Student/Parent Name:

Student/Parent Signature:

Date:

As a teacher of the above student, I support this authentication letter

Teacher Name:

Teacher Signature:

Date:

APPENDIX 2
SCIENTIFIC NOTEBOOK

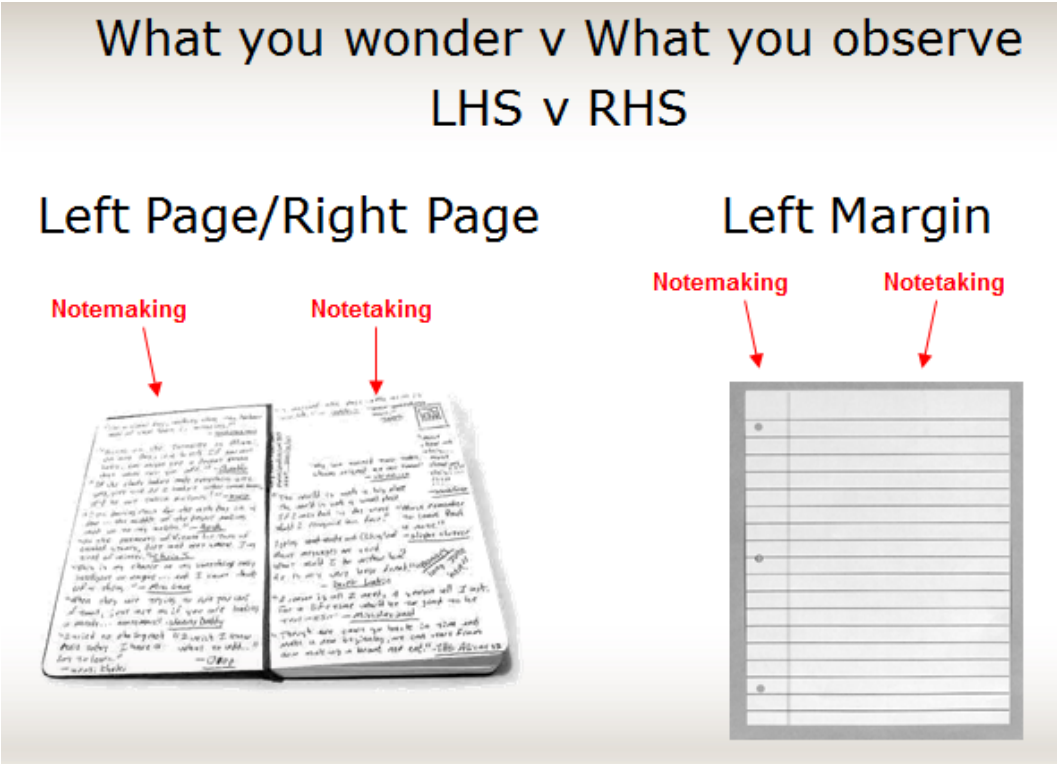
The Scientific Notebook is very important in showing the purpose behind the study, and the way in which the question evolved and was tackled, as well as a record of how the project progressed over time. A Scientific Notebook helps the student make sense of their science learning.

- A Scientific Notebook should be kept as a record of what was completed on different days – include dates
- A Scientific Notebook should contain evidence of scientific thought – include thoughts, questions, insights
- The Scientific Notebook should be a series of ideas, methods and findings
- Accurate and detailed notes of your findings, decisions and thought processes assist the project in becoming a winning entry.
- Good notes show consistency and thoroughness to the judges.
- Acknowledge any assistance received.
- Can be either typed or hand written.

Notetaking and Notemaking

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 **Notemaking.**



For more information, email: scienceonthego@griffith.edu.au or visit www.griffith.edu.au/science-on-the-go

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