STAQ Science Teachers Association of Queensland

Queensland Science Contest Entry Information

Scientific Investigations

Engineering and Technology Projects

Communicating Science

Classified Collections

Environmental Action Projects

Mathematical Investigations

Rowe Poster Presentation

Over $12000 in prizes

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Queensland Association of Mathematics Teachers

The University Of Queensland Australia CREATE CHANGE

Queensland Science Contest

Background

The Queensland Science Contest is an annual event organised by the Science Teachers Association of Queensland (STAQ). The contest is open to all Queensland students from pre-school to year 12 and is judged across 7 age divisions. Students may enter their projects in one of 5 categories.

They may also nominate to be considered for up to 2 bursary awards, provided their project topic is relevant to the particular bursary. Representatives from scientific and educational organisations will judge the projects.

Aims

- Stimulate an ongoing interest in the study of science
- Allow students of all ages to experience self-motivated project work
- Encourage students to communicate their passion and understanding of science to a wider audience
- Provide recognition of effort and achievement to students who participate
- celebrate the exemplary science carried out by Queensland students.

Conditions of Entry

Failure to meet all entry deadlines may result in disqualification of the entry.

- Entries must meet the safety standards outlined in the Contest Handbook.
- Projects involving illegal activities will not be accepted.
- ALL entries must be submitted electronically.
- Entries must be uploaded as outlined in the Contest Handbook. Submit online entries by the advertised submission date. Late arrivals will not be judged.
- Models and inventions may contain commercially available components such as switches, motors, meters etc, however entries must not have been solely assembled from, or based on commercially produced kits.
- Entries must not breach Copyright regulations.
- Acknowledgement of all assistance received in preparing the entry is to be noted in the reflective journal or questionnaire. .

Types of Awards & Prizes

Individuals and groups of 2 or 3 students may submit an entry. Entries will be judged across 6 categories and 7 age divisions.

Age Divisions

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

Categories

Entries must be relevant to one of the categories listed below. For details about each category, refer to the specific category information downloadable from the STAQ Science Contest webpage or in this handbook. Prizes will be awarded for 1st, 2nd and 3rd in each age division for each of the categories (providing entries are of a suitable quality).

- Scientific Investigations
- Engineering and Technology Projects
- Classified Collections
- Communicating Science
- Environmental Action Projects
- Mathematical Investigations
- Rowe Poster Presentation

Registration Fees
Individuals: $5.00 per project

Groups (maximum 3 members): $10.00 per project

Registration & Payment Options
Register online

Pay by:
- **Credit Card**
- **Cheque/Money Order (made out to Science Teachers Association of Qld)**

STAQ Science Teachers Association of Queensland

Prizes and Awards

All entries are recognised with a Certificate of Participation and winners also receive a certificate for placing 1st, 2nd, 3rd or Highly Commended. Students who are awarded 1st, 2nd, 3rd or Highly Commended may receive cash prizes (paid via nominated bank transfer) while Highly Commended recipients receive a certificate. These four prizes are awarded in each category and division at the judges' discretion. In some cases, not all prizes are awarded.

Students who win an award in the Scientific Investigations and Engineering and Technology Projects sections of the Queensland Science Contest may be submitted as entrants in BHP Foundation Science and Engineering Awards.

The BHP Foundation Science and Engineering Awards provide significant cash prizes to primary and secondary students.

There is no additional fee to have your entry considered for the BHP Foundation Science and Engineering Awards. For more information about the BHP Foundation Science and Engineering Awards go to their website (http://www.scienceawards.org.au/student_awards/).

Bursary Awards

Bursary Awards are provided by a range of organisations to recognise student work in specific disciplines or topics. The organisations determine the amount of their award and the criteria against which it is judged.

Prizes will be awarded to the best entry or entries relevant to each bursary as judged by a representative of the organisation donating the prize. As new bursaries may become available between now and the contest closing date, students should refer to the latest list of bursaries available on the STAQ website (http://www.staq.qld.edu.au) for the latest information on the Queensland Science Contest.

Other Awards

CSIRO Crest Awards

Projects completed as part of the CSIRO CREST Awards may be entered in the Queensland Science Contest. Alternatively, projects entered in the Queensland Science Contest may be suitable to be entered in other science competitions. Students entering any science contest are advised to make copies of their report prior to submitting it for judging, in the event that the entry is lost or damaged.

Maths Talent Quest

The focus of the Maths Talent Quest is on the process of mathematical investigations. Open to all primary and secondary students, the Maths Talent Quest aims to promote interest in mathematics and foster positive attitudes amongst students, teachers and parents.

Looking at real life situations and finding that mathematics is everywhere helps capture the imagination of both teachers and students alike. The Maths Talent Quest allows students to investigate mathematics on an individual, group or class basis with the opportunity to have fun exploring mathematics in real life situations. Assessment through a rubric helps to evaluate students' progression through the process strands.

Notification of Winning Entries

Students' teachers with winning entries will be notified by email, and COVID-19 regulations permitting winning students and families will be invited to attend the presentation of awards.

Awards Ceremony

Due to the evolving nature of COVID-19 restrictions a date, venue and format of the awards ceremony has not been determined. If yours is a winning entry, please look out for an email regarding the awards ceremony.

Entry Checklist

☐ **Registration and payment**
Register online by closing date.

☐ **Consent form**
Must be uploaded (preferably in PDF format) with the project.
All entries must be accompanied by appropriate documentation as outlined in the specific category information.

Students should keep a copy of their written work as projects.
STAQ is not responsible or liable for any projects which fail to upload.

Important Information

Safety & Ethical Considerations

Students and their supervising teachers or parents should ensure that their science entries are conducted in a responsible and safe manner.

For example:

- Any study involving experiments on living animals must be carefully considered to ensure that the animal(s) are properly cared for. Projects involving living animals must follow national guidelines.
- Projects involving microorganisms will only be accepted if adequate safety precautions are evident and the microorganisms present no threat to the health of individuals or the environment.
- Agar plates will NOT be accepted as part of a physical entry.
- All cultured organisms should be treated as potentially pathogenic. Agar plates should not be exposed where pathogenic organisms may exist, e.g. toilets, near persons coughing or sneezing. Further guidelines are available at the Education Queensland website.
- Projects involving blood or other body fluids will only be accepted if they have been carried out under strict medical supervision, for instance, in a hospital research centre while working with a scientist. No blood products will be accepted as part of a physical entry.
- Projects involving hazardous chemicals, explosives, rocket fuels, detrimental to the environment, or potentially harmful to individuals will not be accepted.
- All electrical experiments should not be in excess of 32 volts AC or 115 volts DC.
- Projects involving illegal activities will not be accepted.

Entrants who are unsure as to whether their project complies with the safety considerations should contact the STAQ office for clarification before submitting their entry for judging.

Electronic Entry Requirements

Please note that many categories may require a combination of formats i.e. engineering video with PDF journal

Formats accepted:

• PDF/Word document (no word limit)(max file size 1G)

Appropriate for:
- o Science Investigations
- o Mathematical Investigations
- o Journals for most categories (you could include photos/ scan of the journal if handwritten)

• 3-5min video (max file size 1G, format .mp4 .avi or .mov)

All video should be clearly audible and easy to watch. The film technique will not be judged, however judges need to gain an understanding of your project.

Don't forget your journal – you could include photos/scan of the journal if handwritten.

Appropriate for:
- o Engineering and technology projects (note the video is a requirement of this category)
- o Communicating Science
- o Environmental Action Projects
- o Mathematical Investigations

• PPT

Don't forget your journal – you could include photos/scan of the journal if handwritten.

Appropriate for:
- o Communicating Science
- o Environmental Action Projects
- o Mathematical Investigations

• Photos

Don't forget your journal – you could include photos/scan of the journal if handwritten.

Appropriate for:
- o Classified collections
- o Poster Presentations
- o Communicating Science
- o Environmental Action Projects
- o Mathematical Investigations

If you have any questions please contact Gaynor on email staq@staq.qld.edu.au or the STAQ mobile number: 0490 950 249.

NO RESPONSIBILITY WILL BE ACCEPTED FOR DAMAGED OR LOST ENTRIES

Scientific Investigations

Note: Selected projects in this category are eligible for entry into the BHP Foundation Science and Engineering Awards National Competition

What to do

1. Choose a topic for your investigation.
2. Keep an electronic or written journal or notebook that explains what you do and why. (handwritten journals maybe scanned for electronic entry submission)
3. Collect the necessary background information and set some realistic aims.
4. Design and perform one or more experiments that will make up the investigation.
5. Analyse the results and draw your conclusions.
6. 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?

- The topic of the investigation should be relevant, original and creative It should address an issue of scientific significance that may be of a social, local or personal nature.
- The approach should be original, creative and resourceful.
- The use of and/or design of equipment should be original and creative.
- The report should include:
  - Realistic aims
  - Details of the materials used and the procedure
  - Risk assessment
  - Determination of variables to control
  - Evidence of replication of results, accuracy and thoroughness
  - Results, observations, measurements, graphics and text
  - Discussion of the results referring to the aims
  - Explanation of errors and anomalies
  - Reasonable conclusion from the data
  - Suggestions for further research
  - Appropriately acknowledge any assistance. Clarify which aspects of the project were devised and carried out alone and which aspects were not and what sort of assistance was provided.

The Journal, logbook or notebook

This shows the purpose behind the study, and the way in which the question evolved and was tackled, as well as a record of how the work progressed (including the disasters).

- Good notes show consistency and thoroughness to the judges.
- A reflective journal could be kept. It should contain evidence of scientific thought.

Some ideas to get you started

- Does the temperature of a magnet affect its strength?
- How does the type of soil affect the growth of a bean plant?
- Which type of paper towel has the highest level of absorption/capillary action?
- Which material is the best for insulating a can of drink?
- How does sugar affect the growth of yeast?
- What is the best metal conductor?
- How fast does light travel in different substances?
- Which tea contains the least amount of caffeine?

Judging Criteria

STAQ Science Teachers Association of Queensland

SCIENTIFIC INVESTIGATIONS

			5 Exceed expectations of student's learning level	4	3 Evident and appropriate to learning level	2	1	0 Not Evident
Investigative Process	Choice of Topic	Provides an appropriate aim. Predicts results and/or describes a hypotheses to be tested.						
		Explains how and why they chose the topic and approach to the investigation						
		Description of how project fits into a wider scientific context						
	Plan of the Investigation	Planning of fair investigation						
		Identifies and describes how variables are controlled where necessary						
		Description of how to manage the work safely, collection of reliable data and other evidence						
	Interprets Results	Summarising data using graphs, tables and other representations, appropriate use of mathematics, description of trends and relationships						
		Identification of errors and reference to plausible causes of errors						
	Findings and Conclusions	Writes a conclusion that discusses the key findings of the investigation Was my initial aim/ hypotheses achieved?						
		Communicates the investigation and findings appropriately using scientific language and representations						
Science Focus	Validity	Draws on relevant evidence and relationships to support conclusions						
	Understanding	Suggests effective improvements to methods and quality of data collection						
	Creative	Demonstrates and original and creative approach to solving the problem showing ingenuity/originality						
Evidence of ownership	Legibility	Presents the investigation in a legible, logical and appealing manner.						
	Acknowledgements	Acknowledges resources used (including reference materials and assistance from other people).						
	Evidence	Has provided detailed evidence of work (such as draft, workings and/or notes) ensuring the investigation is a true representation of the student's learning and understanding.						
		TOTAL						

Engineering and Technology Projects

Note: Selected projects in this category are eligible for entry into the BHP Foundation Science and Engineering Awards National Competition

What to do

1. Choose a problem

2. Design a device or product to
   a. Solve the problem; or
   b. Offer a different approach to a problem.

3. Create the device or product. (ICT-based projects in an Engineering or Science context that have a positive impact are also eligible.

4. Develop a 3-5 minute film of the device/product in operation.

5. Write a report of up to 1000 words. Marks will be deducted for reports that exceed this amount.

What makes a winning entry?

- The problem should be significant, complex and relevant.

- The approach should be original, creative and resourceful.

- The product should be well made, elegant and easy to use. It should have dimensions not exceeding 76cm in depth, 122cm in width and 100cm in height)

- The report should:
  - Explain how/why you chose the problem
  - Set out some realistic aims
  - Explain how the problem is significant and relevant. (Refer to relevant references, resources and literature to place the project in a wider scientific context.)
  - Explain how you went about solving the problem in an original, creative and resourceful way, including any problems you overcame and how you undertook testing. (This may be presented in the format of a journal. The journal may be typed or handwritten and scanned for online entry submission.)
  - Explain the limitations of the product or device and suggest further improvements.
  - Include a risk assessment evidencing safety considerations in the planning stages and use of the final product
  - Appropriately acknowledge any assistance. Clarify which aspects of the project were devised and carried out alone and which aspects were not and what sort of assistance was provided.

- The video should be 3-5min (max file size 1G, format .mp4 .avi or .mov)
  All video should be clearly audible and easy to watch. The film technique will not be judged, however judges need to gain an understanding of your project.

  Don't forget your journal – you could include photos/scan of the journal if handwritten.

  - **Demonstrate the device/product in use.**
  - **Clearly show how the product is easy-to-use, elegant and well made.**
  - **How well the device/product addresses the problem.**
  - **Be clearly audible and easy to watch.**

Some ideas to get you started

- simple materials used creatively
- solves/reduces a problem of the aged
- solves/reduces a problem of the disabled
- a non-harmful pest control device e.g. non-harmful live capture then release mouse trap
- reduces/solves an environmental concern. If appropriate, you may wish to explain how your project reduced materials or energy used, the amount of material thrown away, or air or water pollution. Keep careful records and use "before and after" data to demonstrate the difference that your project made for waste reduction, resource conservation or pollution prevention.

Some questions to ask yourself in preparing the device/ product and report

- To what degree is the innovation new and/or different?
- Where could it be used?
- What are the costs and benefits of the idea?
- What are the consequences, immediate and long-term of employing this idea?
- How does it help with a preferred future for society?
- How were the items utilized in appropriate and/or new ways?
- What are the energy implications – requirement, wastage - of the idea?
- How well is the project constructed and organised?
- How clear/well prepared is the presentation?
- Is the idea clearly demonstrated and explained?
- Is there a compelling reason for uptake of the innovation?

Engineering and Technology Projects

Some Restrictions:

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. Examples of appropriately qualified person are an electrician or an electrical engineer. Entries using 240v power that do not have an accompanying note of compliance will not be judged.

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

- **Living organisms, including plants**
- **Soil, sand, rock, and/or waste samples, even if permanently encased in a slab of acrylic**
- **Taxidermy specimens or parts**
- **Preserved vertebrate or invertebrate animals**
- **Human or animal food**
- **Human/animal parts or body fluids (for example, blood, urine)**
- **Plant materials (living, dead, or preserved) that are in their raw, unprocessed, or non manufactured state (Exception: manufactured construction materials used in building the project or display)**
- **All chemicals including water (Projects may not use water in any form in a demonstration)**
- **All hazardous substances or devices (for example, poisons, drugs, firearms, weapons, ammunition, reloading devices, and lasers)**
- **Dry ice or other sublimating solids**
- **Sharp items (for example, syringes, needles, pipettes, knives)**
- **Flames or highly flammable materials**
- **Batteries with open-top cells**
- **Glass or glass objects unless deemed by the BHPFSEA Coordinator or judges to be an integral and necessary part of the project (for example, glass that is an integral part of a commercial product such as a computer screen)**
- **Any apparatus deemed unsafe by the BHPFSEA 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.)**

Judging Criteria

STA Science Teachers Association of Queensland

ENGINEERING & TECHNOLOGY

			5 Exceed expectations of student's learning level	4	3 Evident and appropriate to learning level	2	1	0 Not Evident
Investigative Process	Choice of Topic	Identification of a problem that can be investigated scientifically and creating plausible aims for the project						
		Informed explanation of the problem and its significance linking to background research						
		Description of how project fits into a wider scientific context						
	Plan of the Project	Thorough planning of device/product to solve problem						
		Identifies and describes how variables are controlled where necessary						
		Describes testing process for device/product						
		Description of how to manage the work safely, collection of reliable data and other evidence						
	Interprets Results	Summarising data using graphs, tables and other representations, appropriate use of mathematics, description of trends and relationships						
		Identification of limitations of device/product in addressing the problem and aims						
	Findings and Conclusions	Coherent explanation of the product or device in use and how it addresses the problem and aims for the project						
		Visually appealing product or device and effective use of design principles						
Engineering Focus	Validity	Draws on relevant evidence and relationships to support conclusions						
	Understanding	Suggests effective improvements to device/product						
	Creative	Demonstrates and original and creative approach to solving the problem showing ingenuity/originality						
Evidence of ownership	Video	Video shows product or device in action and is within acceptable duration time						
	Acknowledgements	Acknowledges resources used (including reference materials, books, websites etc and assistance from other people).						
		Permission to use copyrighted material where applicable						
	Evidence	Has provided detailed evidence of work (such as draft, workings and/or notes) ensuring the product or device is a true representation of the student's learning and understanding.						
		TOTAL						

Classified Collections

What to do

1. Choose a topic for your collection
2. Collect relevant items. Keep a journal/record of where the items were collected, how they were preserved or cared for and your safety considerations in how you safely collected them. Submit the journal/record with your collection.
3. Organise your collection into groups to show relationships between the items in the collection, or to assist in their recognition.
4. Develop a classification scheme. This may be a table, key, field guide or interactive computer program.
5. Present your collection as a poster or report. You may use a series of photographs in place of submitting the actual items that were collected. Include the classification system you have developed in the poster or report.

What makes a winning entry?

The classified collection should seek to help in the understanding of the material that is being collected. There should be:

- a high standard of preservation and presentation of the specimen
- complete and accurate information about the specimens, commensurate with the age of the collector.

The classification scheme can be used to group and identify the specimens. This may take the form of:

- a table of characteristics that can be matched to the specimens to identify them
- a taxonomic grouping of specimens
- a dichotomous key may be appropriate
- an interactive key, using relatively simple computer programming, could provide the basis for an interesting Communicating Science project.

The journal/record of where and how you collected your items and how they were preserved or cared for must be submitted to the contest with the report/poster of your collection. The journal may be typed or handwritten and scanned for online entry submission.

Some ideas to get you started

Geology

The collection may be 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.

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.

Zoology

A classified collection of animals (other than insects) will usually be of durable discarded parts (shells or feathers). 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.

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).

A collection of seeds might investigate the relationships between seed composition (carbohydrate, protein, fat) and taxonomic group, or between seed size and plant habitat (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).

Protected Species

Be aware that there are a number of protected species and protected areas in Queensland where collecting is prohibited - even dead things. They are protected because they are valuable. Ensure that collected specimens are not listed by Environment and Resource Management as protected species or collected from a protected area. The website address is: https://environment.des.qld.gov.au/wildlife/threatened-species

Judging Criteria

STAQ Science Teachers Association of Queensland

Classified Collections

			5 Exceed expectations of student's learning level	4	3 Evident and appropriate to learning level	2	1	0 Not Evident
Investigation Process	Choice of Topic	Identification of specimens which can be classified scientifically in a plausible group						
		Considered selection of good quality specimens						
	Plan of the Project	Making plausible groupings to show similarities and differences						
		Evidence of specimen preservation and careful handling						
		Clear presentation of specimens						
		Description of the safety considerations						
	Interprets Results	Application of science knowledge to generate plausible and informed classification schemes						
		Shows relationships between the items in the collection to assist recognition						
		Includes 3 relevant, labelled diagrams that demonstrate different perspectives or attitudes						
	Findings and Conclusions	Coherent, legible and logical explanation of ideas, methods and eh classification scheme using appropriate scientific language and representations						
Science Focus	Validity	Draws on relevant evidence and relationships to support conclusions						
	Creative	Demonstrates an original and creative approach to the choice of specimens and their display						
Evidence of ownership	Acknowledgements	Acknowledges resources used (including reference materials, books, websites etc and assistance from other people).						
		Permission to use copyrighted material where applicable						
	Evidence	Has provided detailed evidence of work (such as draft, workings and/or notes) ensuring the product or device is a true representation of the student's learning and understanding.						
		TOTAL						

Environmental Action

What to do:

1. Research a local environmental issue.
2. Consult with members of the community about the issue. This may involve a survey or questionnaire.
3. Present the data. It may be helpful to use tables or graphs.
4. Develop an action plan to help resolve the issue.
5. Explain how the action plan will help to resolve the issue.
6. Put your plan into action
7. Present your investigation and resulting action plan as a poster, report or video.
8. Keep a journal throughout the project and submit with the entry.

What makes a winning entry?

An effective project will:

- show a clear understanding of the environmental issue
- explain how the issue was investigated scientifically and how community members were consulted
- graphically represent data e.g. tables or graphs
- set out the action plan in a clear and concise manner
- explain clearly how the action plan will resolve the issue
- demonstrate active, practical involvement in the issue at a local level
- be creative and original.

The Reflective Journal

The reflective 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 work progressed

A reflective journal should

- keep a record of what was completed throughout the project. It should contain evidence of scientific thought to help the student make sense of their science learning.
- The journal may be typed or handwritten and scanned for electronic entry submission.
- Contain accurate and detailed notes of any findings, decisions and thought processes assist the project in becoming a winning entry.
- acknowledge any assistance received.

3-5min video (max file size 1G, format .mp4 .avi or .mov)

All video should be clearly audible and easy to watch. The film technique will not be judged, however judges need to gain an understanding of your project.

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Some ideas to get you started

- Develop a plan for your school to reduce litter
- Develop a plan for managing weeds at the local creek
- Develop a plan for less students to use cars to get to school
- Develop a plan for your school/community group to use less electricity/water

Judging Criteria

STAQ Science Teachers Association of Queensland

ENVIRONMENTAL ACTION PROJECT

			5 Exceed expectations of student's learning level	4	3 Evident and appropriate to learning level	2	1	0 Not Evident
Process	Choice of Topic	Identification of a problem that can be investigated scientifically and creating plausible aims for the project						
		Informed explanation of the problem and its significance linking to background research						
		Description of how project fits into a wider scientific context						
	Plan of the Project	Planning of investigation						
		Identifies and describes a fair process for consulting community members						
		Identifies and describes how the consultation will be done to minimise any bias						
	Messaging	Summarising data using graphs, tables and other representations, appropriate use of mathematics, scientific language and Imagery, description of trends and relationships						
		Clear and concise action plan, drawing on relevant evidence to support action plan						
	Findings and Conclusions	Coherent explanation of how the action plan addresses the problem and aims for the project						
		Identification of the limitations of the action plan						
Science Focus	Validity	Draws on relevant evidence and relationships to support conclusions						
	Understanding	Making plausible suggestions for further improvements						
	Creative	Demonstrates and original and creative approach to solving the problem showing ingenuity/originality						
Evidence of ownership	Acknowledgements	Acknowledges resources used (including reference materials, books, websites etc and assistance from other people).						
		Permission to use copyrighted material where applicable						
	Evidence	Has provided detailed evidence of work (such as draft, workings and/or notes) ensuring the product or device is a true representation of the student's learning and understanding.						
		TOTAL						

Communicating Science

What to do

1. Choose a scientific concept
2. Research the concept
3. Choose a target audience e.g. preschool students, aged pensioners, English teachers
4. Choose a communication medium e.g. poster, game, webpage, comic strip, model or video
5. Develop the chosen medium within the constraints listed below.
6. Write a report about your research, audience and medium

What makes a winning entry?

- The approach should be original, creative and resourceful.
- The report should:
  - clearly explain and justify 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
  - explain how you designed your entry (eg worked out what to do)
  - discuss what was the most challenging part and what you would do differently next time.
- The chosen medium should be well made, elegant and easy to follow.

A note on originality, authenticity and Copyright

All work must be original. Any images used must either

- not be subject to copyright or
- include a letter stating that you have received permission to use the work accompanies the entry.
- Entries containing any unauthorised content will be disqualified.

Constraints for the Communication Mediums

Cartoon/Comic Strip

- Detail a single or series of cartoons which are hand drawn or computer generated.
- Photos or PDF/PPT/SWAY of the cartoon/comic strip must be submitted for judging.

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.
- A video of you playing the game and clear Instructions for running the program must be included.

Poster

- Present a single or series diagrams/paintings/ drawings with or without text.
- Diagrams must be hand drawn or computer generated.
- Text must be your own words.
- Photos or PDF/PPT/SWAY of the poster must be submitted for judging.

PowerPoint Presentation

- Prepare a series of slides with/without sound Video/ DVD/ Animation/Simulation
- Create a visual media presentation
- The presentation must be an original piece of work no longer than 5 minutes.

Website

- Clear Instructions for using the website must be included.

Model

- Should be well made, elegant and easy to use. It should have dimensions not exceeding 76cm in depth, 122cm in width and 100cm in height)
- Video or photos explaining the use/function of the model must be submitted for judging.

Video/DVD/Animation/Simulation

- Each video/DVD/Animation/Simulation must be no longer than 300 seconds (3-5 minutes). All video should be clearly audible and easy to watch. The film technique will not be judged, however judges need to gain an understanding of your project. Maximum file size 1G, format .mp4 .avi or .mov)
- Ensure that all content in your presentation (including footage, music, images, props, etc.) is your own. If you include any copyrighted or trademarked content, you must be able to provide written permission for its use. .

Some ideas to get you started

- A PowerPoint presentation about buoyancy
- A comic strip about why things dissolve
- A game about how diseases are transmitted
- A model of how the human heart pumps blood

STAQ Science Teachers Association of Queensland

Judging Criteria

STAQ Science Teachers Association of Queensland

COMMUNICATING SCIENCE

			5 Exceed expectations of student's learning level	4	3 Evident and appropriate to learning level	2	1	0 Not Evident
Process	Choice of Topic	Identification of a problem that can be investigated scientifically and creating plausible aims for the project						
		Informed explanation of the problem and its significance linking to background research						
		Description of how project fits into a wider scientific context						
	Plan of the Project	Selection of appropriate communication medium to meaningfully communicate the concept						
		Justification of how the communication medium is suited to the identified target audience						
		Planning of the design of the communication medium						
		Application of science knowledge to effectively communicate the scientific concept.						
	Messaging	Summarising data using graphs, tables and other representations, appropriate use of scientific language and Imagery, description of trends and relationships						
		Identification of limitations of medium in addressing the problem and aims						
	Findings and Conclusions	Coherent communication of scientific concept						
		Visually appealing and effective use of design principles for the selected medium						
Communication Focus	Validity	Meets specifications for the category – cartoon/comic strip; Game; Poster; Powerpoint Presentation; website or model or video						
	Understanding	Suggests effective improvements to device/product						
	Creative	Demonstrates and original and creative approach to solving the problem showing ingenuity/originality						
Evidence of ownership	Acknowledgements	Acknowledges resources used (including reference materials, books, websites etc and assistance from other people).						
		Permission to use copyrighted material where applicable						
	Evidence	Has provided detailed evidence of work (such as draft, workings and/or notes) ensuring the product or device is a true representation of the student's learning and understanding.						
		TOTAL						

Mathematical Investigations

What to do

1. Choose a topic for your investigation
2. Collect the necessary background information and clearly state a realistic problem to investigate
3. Use mathematical approaches to solve the problem
4. Present a report to tell others what you did and what you found out. Include any references and acknowledge the assistance you receive.

Projects can be on any mathematical topic and may be presented in a variety of forms such as:

- **Written report**
- **Written as a booklet, brochure or poster**
- **Powerpoint presentation**
- **Video**

What makes a winning entry?

- The topic of the investigation should be relevant, original and creative It should address an issue of significance that may be of a social, local or personal nature.
- The approach should be original, creative and resourceful and integrate a range of mathematical concepts and processes.
- Present the investigation in a legible, logical and appealing manner.
- The report should include:
  - Clear questions/aims for investigation and predicts results and/or describes a hypotheses to be tested.
  - Explanation of how and why the topic is chosen and the approach to the investigation.
  - Details of the materials used and the procedure lists the mathematical strategies and content that have been used in the investigation.
  - Describes how the mathematical strategies and content have been used to achieve results.
  - Evidence of replication of results (if appropriate), accuracy and thoroughness
  - Analyses their findings and publishes these appropriately. Results, observations, measurements, graphics and text uses correct mathematical terms and symbols and uses accurate mathematical skills.
  - Discussion of the results referring to the aims.
  - Explanation of errors and anomalies and analyses mathematical connections within the investigation.
  - Uses critical and creative thinking to explore mathematics within the investigation.
  - Reasonable conclusion
  - Suggestions for further research
  - Appropriately acknowledge any assistance. Clarify which aspects of the project were devised and carried out alone and which aspects were not and what sort of assistance was provided.
  - Has provided detailed evidence of work (such as draft, workings and/or notes) ensuring the investigation is a true representation of learning and understanding.
- 3-5min video (max file size 1G, format .mp4 .avi or .mov) All video should be clearly audible and easy to watch. The film technique will not be judged, however judges need to gain an understanding of your project.

Prizes in this category are sponsored by Queensland Association of Mathematics Teachers

Winning entries in this category may be entered in the **National Maths Talent Quest.**

The focus of the Maths Talent Quest is on the process of mathematical investigations. Open to all primary and secondary students, the Maths Talent Quest aims to promote interest in mathematics and foster positive attitudes amongst students, teachers and parents.

Looking at real life situations and finding that mathematics is everywhere helps capture the imagination of both teachers and students alike.

The Maths Talent Quest allows students to investigate mathematics on an individual, group or class basis with the opportunity to have fun exploring mathematics in real life situations. Assessment through a rubric helps to evaluate students' progression through the process strands.

Some ideas to get you started

- Investigate a particular theme following normal class lessons in a particular area.
- An excursion to the Zoo, museum, or historical village could provide a useful source of ideas and motivation for your project.
- Current events or special celebrations such as the International Year of Food Design or Centenary of the Australian Airforce may also prove a starting point.
- Investigate the mathematical content of a specific interest e.g. maths in basketball, budgeting for a holiday.

Judging Criteria

STAQ Science Teachers Association of Queensland

MATHEMATICAL INVESTIGATIONS

			5 Exceed expectations of student's learning level	4	3 Evident and appropriate to learning level	2	1	0 Not Evident
Investigative Process	Choice of Topic	Provides an appropriate mathematical aim. Predicts results and/or describes a hypotheses to be tested						
		Explains how and why they chose the topic and approach to the investigation						
	Plan of the Investigation	Lists the mathematical strategies and content that have been used in the investigation.						
		Describes how the mathematical strategies and content have been used to achieve results						
	Communication of findings	Analyses their findings and publishes these appropriately.						
		Writes a conclusion that discusses the key findings of the investigation. Was my initial aim/ hypotheses achieved?						
		Reflects on the mathematical learning achieved from the investigation.						
		Communicates the investigations and findings appropriately to the given audience						
Maths Focus	Validity	Uses correct mathematical terms and symbols						
		Uses accurate mathematical skills.						
	Understanding	Analyses mathematical connections within the investigation						
	Creative	Uses critical and creative thinking to explore mathematics within the investigation						
Application	Legibility	Presents the investigation in a legible, logical and appealing manner						
	Acknowledgements	Acknowledges resources used (including reference materials and assistance from other people)						
	Evidence	Has provided detailed evidence of work (such as draft, workings and/or notes) ensuring the investigation is a true representation of the student's learning and understanding						
		TOTAL						

Poster Presentation

What is a science poster?

A science poster is an attractive and visual way to present a message about a science topic. The message is presented clearly, quickly and relies on impact. The poster should be eye-catching in order to get the message across.

What to do:

- select an idea around a theme
- decide on a message you want the poster to tell
- find out about your topic
- plan your poster
- locate resources
- make your poster

What makes a winning entry?

A winning entry:

- has accurate science content.
- will communicate the single idea clearly.
- will show good quality drawing, artistic skills and imagination, giving the poster visual appeal.
- will use minimal words that can be easily read from a distance and that are appropriate to your year level.

Some ideas to get you started

- Exploring the moon
- A new colony on Mars
- Use of drones in industry
- Edible vaccines
- Architectural acoustics
- Seismology
- Sustainable chemistry
- Alternative energy
- Environmental conservation strategies

Entry Guidelines

You are required to:

- Give a clear explanation of the scientific and technical principles involved (refer to the diagrams you have used that help illustrate these principles)
- Explain the significance and impact that the topic has in the real world (refer to the diagrams you have used that help illustrate these principles)
- Include at least 3 relevant diagrams which summarise the two guidelines above
- List acknowledgements and references used. Put these in a small box at the bottom right hand corner of the poster.
- Posters must not have any built-up or three-dimensional sections.
- All diagrams and text must be original: Text must be in your own words. It may be hand written or produced via computer. The text needs to be concise (use just enough words to explain the topic ideas when a person looks at the poster/chart for a couple of minutes.) Diagrams may be either hand drawn or produced using tools on a computer. Diagrams copied from other software or downloaded are not acceptable.
- Maximum word limit is 400 words, including headings, explanations and captions; excluding bibliography
- Written information must be legible (visible from 1 metre) and contain a major heading for the topic and sub-headings (visible from 2 metres) for ideas/ concepts within the topic.
- Diagrams must have clear headings/labels and be distinguishable from a distance of 2 metres.
- Judges will look for evidence of accurate and relevant scientific content, understanding of the material presented, and depth of investigations, innovative and creative thought in the visual presentation and in the selection of ideas investigated.
- Electronic submission must include high resolution photos (to ensure that judges can zoom in to see the written detail).

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Prizes in this category are sponsored By Rowe Scientific

STAQ Science Teachers Association of Queensland

Judging Criteria

STAQ Science Teachers Association of Queensland

Rowe Scientific Poster Presentation

			5 Exceed expectations of student's learning level	4	3 Evident and appropriate to learning level	2	1	0 Not Evident
Process	Choice of Topic	Identification of the topic						
		Informed explanation of the topic and scientific and technical principles involved						
		Description of how topic fits into a wider global context or it's impact						
	Plan of the Project	Planning of investigation						
		Demonstrates an understanding of the factors which may affect attitudes to a scientific idea or issue						
		Demonstrates an understanding of different perspectives or attitudes surrounding a scientific idea or issue						
		Demonstrates awareness/knowledge/comparison of change over time in scientific ideas						
	Interprets Results	Summarising data using graphs, tables and other representations, appropriate use of mathematics, scientific language and Imagery, description of trends and relationships						
		Identification of errors and reference to plausible causes of errors						
		Includes 3 relevant, labelled diagrams that demonstrate different perspectives or attitudes						
	Findings and Conclusions	Coherent, legible and logical explanation of ideas, methods and findings using appropriate scientific language and representations						
		Presents a balanced argument in addressing the scientific topic						
Science Focus	Validity	Draws on relevant evidence and relationships to support conclusions						
	Understanding	Making plausible suggestions for further improvements in data collection/ presentation						
	Creative	Demonstrates an original and creative approach to solving the problem showing ingenuity/originality						
Evidence of ownership	Acknowledgements	Acknowledges resources used (including reference materials, books, websites etc and assistance from other people).						
		Permission to use copyrighted material where applicable						
	Evidence	Has provided detailed evidence of work (such as draft, workings and/or notes) ensuring the product or device is a true representation of the student's learning and understanding.						
		TOTAL						