

Science Talent Search 2016

The Science Teachers' Association of Western Australia (STAWA), the professional body representing primary and secondary teachers of Science, invites primary and secondary students to participate in the **58th Science Talent Search (STS)** competition. The Science Talent Search aims to promote science teaching and learning through creative project work.

Governor's School STEM Award

The Primary and Secondary Schools awards will acknowledge school leadership and excellence in science and mathematics as part of STEM education. Participation in the Science Talent Search competition will add value to school nominations for these awards.

BHP Billiton Science Awards

This year the STS will again link with the BHP Billiton Science and Engineering Awards. The BHP Billiton Science and Engineering Awards present a considerable number of significant cash prizes to primary and secondary students. Finalists in the Year 3-12 STAWA STS Research Investigation and K-12 Invention categories will be entered into the BHP Billiton Science and Engineering Awards if they meet the requirements of these awards. The overall winner and runner-up of the BHP Billiton Science and Engineering Awards will be given the opportunity to compete at the Intel International Science and Engineering Fair in the USA. To find out more about the BHP Billiton Science and Engineering Awards go to the website www.scienceawards.org.au.

Each year a number of entries are ineligible for judging because they don't meet the requirements outlined in the Entry Guidelines or fall outside the STS Rules. It is important that you read these documents carefully to ensure entries aren't disqualified from judging. Entries that don't meet the requirements will NOT be judged.

CREST Awards

CSIRO's CREST is a useful way to support students undertaking projects for the Research Investigation and Engineering categories. CREST enables student to experience open-ended scientific research or create inventions and new designs. Apart from the support materials available for teachers, CREST also provides recognition for all completed projects. CSIRO CREST projects are also eligible for entry into the BHP Billiton Science and Engineering Awards. For more information about CREST visit their website www.csiro.au/en/Education/Programs/CREST.

Entry Categories

There are three categories for entry:

1. Research Investigation
2. Science Communication
3. Engineering

Entry groupings and prizes

Early Childhood (Years K-2)	up to 10 prizes of \$50.00 each across all categories
Middle Primary (Years 3-4)	up to 10 prizes of \$50.00 each across all categories
Upper Primary (Years 5-6)	up to 10 prizes of \$50.00 each across all categories
Junior (Years 7-8)	\$150, \$100, \$50 in each category
Intermediate (Years 9-10)	\$150, \$100, \$50 in each category
Senior (Years 11-12)	\$150, \$100, \$50 in each category
Open (Years 7-12)	\$150, \$100, \$50 Research Investigation category only

STAWA Young Scientist

- STAWA Young Scientist (Primary) - \$500 and trophy
- STAWA Young Scientist (Secondary) - \$500 and trophy

Young Scientist winners will be judged on the following criteria:

- has won a category prize
- represents outstanding quality and originality
- makes an outstanding contribution to scientific knowledge, society or communication about science
- worthy of publicity in the media.

STS School of the Year

Awarded to the best primary and secondary school with high achievement and participation across a range of categories.

STS Schools of the Year will be judged on the following criteria:

- the number and quality of entries
- have submitted student entries in the previous year's competition
- have submitted entries into more than one category.

STAWA BHP Billiton Science and Engineering Teacher Award Nominee

The BHP Billiton Science and Engineering Teacher Award recognise teachers who engage students in the study of open-ended investigations and work consistently within their school community and wider professional arenas to make an outstanding contribution to science education in Australia. Each Science Teachers' Association is invited to nominate one teacher, chosen for their excellence in teaching, their support of open-ended student investigations and their suitability to represent their state or territory.

STAWA calls for applications from primary and secondary teachers of Science who would like to be considered as STAWA's BHP Billiton Science and Engineering Teacher Awards nominee. Application information can be found on the STAWA website (www.stawa.net). The closing date for applications is 5.00 pm on **Friday 19 August**.

STS key dates 2016

Monday 25 April	School registration opens
Tuesday 10 May	STS launch event – Scitech Discovery Centre 4.30 - 6.30 pm
Monday 13 June – Friday 22 July	Online registration of student entries
Friday 1 July	School registration closes
Friday 22 July	Student registration closes*
Monday 29 June – Friday 29 July	Entry labels for registered entries sent to school coordinators
Monday 8 August	Metropolitan school and non-regional competition school entries for final judging due to STAWA Office by 5.00 pm
Monday 15 August	Finalists entries from regional judging due to STAWA Office by 5.00 pm
Friday 19 August	Teacher nominations
Saturday 20 August	Judging day
TBA	Awards ceremony

** Only registered school will be sent student registration information.*

Science Talent Search 2016 Rules

All entrants and entries must follow the Rules of STS. Students are encouraged to check with their teachers or a supervisor to ensure project work falls within the rules.

1. Judges' decision

The judges' decisions are final. Entries ruled as falling outside the 'Rules of Science Talent Search', will be ineligible for any awards except a participation certificate. Entries ruled as not conforming to the Guidelines for each category (Research Investigations, Science Communication, Engineering), such as the incorrect format, presentation or breaches of ethical or safety requirements, will also be ineligible for any award except a participation certificate. These entries **will not** be judged.

*It is a requirement that a **Risk Assessment Form** is completed for all entries, except Science Posters.* Students should complete this form themselves prior to conducting their experiment, and it should be signed by their supervisor. Entries that don't include a **Risk Assessment Form** will be ineligible for any awards except a participation certificate. A copy of this form can be downloaded from the STAWA Website www.stawa.net.

2. Registration

Entry into the STAWA Science Talent Search is free of charge.

School registration

To register your school and STS School Coordinator online, follow the link on the STAWA website www.stawa.net. All correspondence, including student entry forms, will be sent to the STS School Coordinator.

*Only registered schools will be able to submit entries. Registration opens on **Monday 4 April** and closes on **Friday 1 July**.*

Registration of entries for final judging

It is expected that schools will select entries for final judging. All participants from schools, even those who are not selected for final judging, are eligible to receive a participation certificate.

*Schools must register students selected for **final judging** by **Friday 22 July**. No late registrations will be accepted.*

3. Maximum Number of Entries

To promote Science Talent Search as a competition involving the best of student work, the maximum number of entries accepted from each school will depend on the number of judges that school provides to help with the competition. *Schools that submit more than 10 entries will need to nominate the appropriate number of judges when registering the final entries for judging. The number of entries judged per school will depend on the number of judges provided.*

1 – 10 entries, judge optional, but appreciated.

11 – 20 entries, the school must supply one judge.

21 – 40 entries, the school must supply two judges and so on.

Teachers interested in judging entries for the STS should register their interest on the STAWA website www.stawa.net. *Registration for judges opens on **Monday 1 August**.*

4. Entry groupings

Entries within each category will be judged following entry groupings outlined on the previous page. A student can only enter one grouping. When students from different groupings work together, the grouping of the oldest student will be taken as the grouping for the whole entry.

For example, when students from Year 4 and Year 5 work together, the grouping is taken as Years 5-6.

5. Naming and Ownership.

An entry can be the work of an individual student, or a group of students. A group of students can consist of up to FOUR students, however, entries of more than THREE students are not eligible for entry into the BHP Billiton Science and Engineering Awards. An entry must be the work of the student/s whose name/s appears on the entry.

- **Each entry should include the full name of the students involved and the full name of the school**
- **Make sure the student and school names are spelt correctly** as this information is used to generate certificates.
- Entries from previous years cannot be re-entered.

6. Assistance

- Limited assistance from supervisor/s is permitted, especially in the area of advice, safety and suggestions. Any direct 'hands on' assistance is not permitted under the rules of STS.
- It should be clear to the judges that the student has done all the work. Supervisors should be prepared to attest to this on request.
- Assistance may be sought from institutions other than the school such as universities, technical colleges, etc. This help should be limited to assistance with equipment, advice or other resources as the supervisor sees fit and must not contravene Rules 7 or 8.
- Students must acknowledge any assistance they receive.

7. Security and Collection.

The STAWA accepts no responsibility for the security of entries, although every effort will be made to look after them. Valuable items must not be submitted and students must keep appropriate copies of any material they submit.

Finalist entries not being forwarded to other competitions will be delivered to schools by mail or in person during Term Four. Entries that are forwarded to other competitions will be delivered to schools when they have been returned to STAWA.

8. Permission for the use of the entry for promotional purposes.

Students submitting an entry agree to this work, in full or in part, being utilised for promotional purposes, which may include press releases, public displays and internet sites. The names of students and their schools will be removed from the student work. Photographs of students may also be used for promotional purposes. All finalists will be asked to complete a **Digital Release Form** for this purpose. This form is available on the STAWA Website (www.stawa.net).

9. Ethics.

STAWA is bound by the animal ethics code. As a general guide, any research which involves the use of animals (vertebrate or invertebrate) is unacceptable unless supervised by qualified scientist and conducted in the appropriate safe environment. A **Supervising Scientist Form** must be completed and included with the entry. A copy of this form is available from the STS website (www.stawa.net). Any entry, which, in the opinion of the judges, falls outside this rule, will not be judged.

Human subjects of any investigation must not be identifiable in the investigation, and signed permission must be obtained from each subject. An example of a **Human Subject Permission Form** can be downloaded from the STAWA website (www.stawa.net).

10. Safety

Any entry that, in the opinion of the judges, involves banned chemicals, procedures or materials, that is of danger or potential danger to the entrants or others, will not be judged. These are described in the 'Science Laboratory Manual' (2002, EDWA), which is available from the Department of Education Western Australia. Some of the banned procedures, chemicals and materials are listed below.

Supervisors and students must follow all standard safety precautions and avoid dangerous chemicals or actions. The use of the banned procedures* and materials* described below are permissible if done under the supervision of a qualified scientist and conducted in the appropriate safe environment. A **Supervising Scientist Form** must be completed and included with the entry.

Some of the banned procedures, chemicals and materials are listed below.

Banned Procedures*

The use of culture media, which encourages the growth of human pathogens (e.g. blood agar etc)

All procedures involving the use of human body fluids

The use of blood lancets and blood sampling

Sub culturing bacteria

Banned Chemicals

Amines

Aniline compounds

Cyanide compounds (with the exception of: ferrocyanides and ferricyanides)

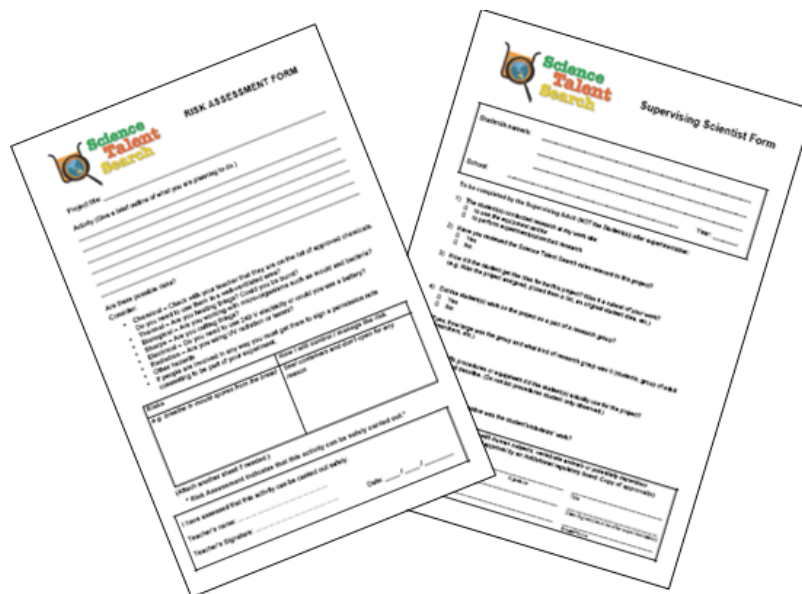
'Captan' fungicide

Insecticides: 'DDT', 'Dieldrin' and 'Aldrin'

Banned Materials*

Any human tissue

Source www.rtg.wa.edu.au/safety/policies.htm



Category 1: Research Investigation

Entry requirements for this category are different for each of the three sections below. Please make sure you read the requirements for the section you are entering.

The different sections for this category are:

- Research Investigation – Early Childhood (K-2)
- Research Investigation – Middle Primary/Upper Primary* (3-6)
- Research Investigation – Junior/Intermediate/Senior/Open* (7-12)

* Entries in these sections may be eligible for selection into the **BHP Billiton Science and Engineering Awards**.

The Open Division is for students who have conducted their research in an institution (for example University) under the supervision of a suitably qualified person.

If students in a class are investigating the same question then the teacher should select the best investigation for entry into this category.

Category 1: Research Investigation (K-2)

An investigation is an attempt to find, in a scientific way, the answer to an original question. In the early years of schooling students use observations to investigate the world around them. They learn that seeking answers to questions and making observations is a core part of science and use their senses to gather different types of information.

Note: In this section it is acceptable for the teacher to give students the question being researched, however, the teacher should select only the best investigations for submission for final judging.

A research investigation in this section involves:

- **asking questions about the topic.** *Why? What if...? How?*
- **posing a question to investigate.** *The question could be given to students or they could come up with their own question.*
- **predicting what they think will happen.**
- **conducting the investigation.** *This could be done individually, in groups or as a class.*
- **making and recording their observations**
- **analysing results to identify patterns and determine if their prediction was correct.**
- **communicating their results to others.**

A successful STS Research Investigation entry in this section will:

- follow the scientific method of investigation
- communicate ideas clearly
- have visual appeal

STS Rules

It is important that all entries comply with the STS Rules. Please read these rules carefully to ensure your entry is eligible for judging.

The judges will be looking for entries that clearly communicate science ideas, use appropriate inquiry skills and that the technical language is appropriate for the age level of the entrants. Refer to the Australian Curriculum for details of the Science Inquiry Skills expected by students in each age grouping. **It is acceptable for a scribe to be used in K and PP.**

Entry guidelines

Tick the requirements below have been satisfied.

Content

The entry should include:

- entry label attached to the back on the poster
- Risk Assessment Form (stuck on the back of the poster) -it can be a photocopy of the class risk assessment.

*It is important that a risk assessment is completed before conducting the investigation. This can be done as a class. A **Risk Assessment Form** is required to be submitted with the entry.*

The poster must include the following parts.*

- Title**
- What I was trying to find out** (Question) - What was the research question?
- What I thought would happen** (Prediction) - What was the student's prediction?
- What I did** (Method) - A description, drawings or photographs to show what they did.
- What I observed** (Observations) - Everything the student discovered (or found out).
- What I have learnt** (Conclusion) - Discuss the results describing the patterns and trends. Was the prediction correct?

* Students can use either the statements in **bold** or those in the brackets for their headings.

Presentation

Your poster should:

- be approximately A2 (42 cm x 59 cm – double A3) in size
- be done on flexible poster paper that can be easily rolled up
- not have any built-up or three dimensional sections.
- be laminated or covered in contact if diagrams or writing has been attached to the poster, so pieces don't fall off in transit.

Category 1: Research Investigation (Years 3-12)

What is a research investigation?

An investigation is an attempt to find, in a scientific way, the answer to an original question. The scientific way may involve careful recording of organised observations such as watching the behaviour of wild birds or the movement of planets. It may use an experimental procedure that involves designing an experiment, controlling variables, interpreting your data and making a conclusion. Investigations always look for reliable results that can be used to explain or predict events.

Note:

It is acceptable for students in Year 3-6 to be given assistance in generating questions for research, however, they should be able to design their investigation to answer the question. From Years 7-12 it is expected that students generate their own research questions.

A research investigation involves:

- **choosing and defining a topic.** *Pick a topic that interests you.*
- **asking questions about your topic.** *Why? What if...? How? It would be a good idea to do some reading about your selected topic. Libraries and the internet are a very useful resource. You could also discuss ideas with others familiar with your topic.*
- **forming an hypothesis.** *This is an educated “guess” as to what you think will happen in a certain set of circumstances or conditions. (Look at ONE change at a time).*
- **investigating your hypothesis.** *To do this properly you will need to design and carry out experiments in a safe manner*.*
- **carefully recording the results of the experiments.** *A survey, if it is used to collect data as part of an investigation, is regarded by STS as an experiment. (Keeping a log book or taking photographs are useful ways of recording).*
- **analysing results.** *What do your results mean?*
- **working logically through your results so as to support or disprove your hypothesis.**
- **writing a report to tell others what you did and what you found, based on experiments you carried out.** *The experimental report is NOT a research assignment.*

** It is important that a risk assessment is completed before conducting the investigation. A **Risk Assessment Form** is required to be submitted with the entry.*

A successful STS Research Investigation entry will:

- follow the scientific method of investigation
- communicate ideas clearly
- be an original investigation
- include evidence of reading on the topic

STS Rules

It is important that all entries comply with the STS Rules. Please read these rules carefully to ensure your entry is eligible for judging.

The judges will be looking for entries that clearly communicate science ideas, use appropriate inquiry skills and that the technical language is appropriate for the age level of the entrants. Refer to the Australian Curriculum for details of the Science Inquiry Skills expected by students in each age grouping.

Category 1: Research Investigation - Years 3-6

Entry guidelines

Tick that you have satisfied each of the requirements below.

Content

Your entry should include:

- entry label attached to the top right-hand corner of title page
- written report following the headings described below
- Risk Assessment Form
- Supervising Scientists Form (if required)
- Human Subject Permission Form (if required)

Your report format must include at least the following parts.

- Title page and Table of contents**
- Introduction** - *What gave you the idea? How did you get started? Include any background research you have done on the topic.*
- Aim** - *What you are trying to find out? What did you think would happen?*
- Materials** - *List these.*
- Method** - *List everything you did, but remember to keep them in order (like a recipe). Describe the safety requirements you followed in conducting this experiment.*
- Results** - *Everything you discovered (or found out). To show all this use tables, graphs, pie charts, photos etc...*
- Discussion** - *Discuss your results describing the patterns and trends. How could you improve your experiments?*
- Conclusion** - *List the main things you have discovered or found out. Go back to your results - what do they tell you?*
- Acknowledgements and References** - *Make sure you include a list of people who gave you help/advice and list any books or websites you used.*

Presentation

- When your report is finished ask your teacher or parent(s) to check your report to make sure it follows the guidelines.
- Your report should be typed on single sided A4 paper and stapled in the top left corner. The whole report may be placed in a plastic sleeve for protection. Do not bind or place in a presentation folder.

Category 1: Research Investigation - Years 7-12

Entry guidelines

Tick that you have satisfied each of the requirements below.

Content

Your entry should include:

- entry label attached to the top right-hand corner of title page
- written report following the headings described below
- Risk Assessment Form
- Supervising Scientists Form (if required)
- Human Subject Permission Form (if required)

Your report format must include at least the following parts.

- Title page and Table of contents**
- Abstract** - *Give a brief description of what you did and what you achieved.*
- Introduction** - *This must be relevant to the topic and explain why you chose this topic. It must define key terms and provide some background information as well as answering the question "What were you looking at?" Some information from your background reading would be useful. This could be in the form of a literature review.*
- Aim** - *This must give a clear indication of your investigation. Include your hypothesis.*
- Materials** - *List or describe the equipment you used to carry out your experiment.*
- Method** - *Presentation of the method should allow someone else to follow your experiment step by step. Method should report what was actually done, not what you should do. Include any mistakes. Remember to include a description of the safety precautions you used to conduct the experiment. For example, "because the chemicals were corrosive, we wore safety glasses".*
- Results** - *Present your results in an easily understood format which may include tables, graphs, photos, maps and descriptions. All information should be clearly labelled. Where possible, results should involve measurement. Avoid subjective results such as those involving likes and dislikes.*
- Discussion** - *Analyse what your results show. Discuss the implications and validity of your results. Did your results support or disprove your hypothesis? What problems did you encounter? How could you improve on your experimental design or data collection? What errors could you have made? Reflect on unexpected results.*
- Conclusion** - *The conclusion must relate to the aim. Has the hypothesis been supported or disproved?*
- Acknowledgements and references** - *All research is based on some background information therefore a reference list must be included. You should list the books, journals and websites you referred to and the people who gave you help or advice.*

Presentation

- When your report is finished ask your teacher or parent(s) to check your report to make sure it follows the guidelines.
- Your report should be typed on single sided A4 paper and stapled in the top left corner. The whole report may be placed in a plastic sleeve for protection. Do not bind or place in a presentation folder.

Category 2: Scientific Communication

What is scientific communication?

Communication is important in the scientific community to inform the public and other scientists about science ideas. When communicating about science it is important that ideas are presented clearly and concisely, and that the technical language is appropriate to the target audience.

Scientific communication can take many forms. They can be written reports, article for journals, posters or digital presentations. In the STS Scientific Communication category entries can take the form of:

- Science Poster (Years K-2 only)
- Science Video (Years K-12)
- Scientific Photography (Years K-12)

Science Poster (Years K-2 only)

What is a science poster?

A decorative science poster is an attractive and visual way to give a message to the public about an issue that is related to science. It is a way of giving this message clearly, quickly and relies on 'impact'. A poster for STS is not a project on one page.

This year's theme for Scientific Communication Posers is "Drones, Droids and Robots". Only entries based on this theme will be judged.

The poster should avoid clichés such as 'mad scientist'. The poster needs to create eye-catching ways of getting a message across quickly and dramatically.

Developing a science poster involves:

- selecting an idea
- deciding on a message you want the poster to tell
- finding out about your topic
- planning your poster
- locating resources
- making your poster

A successful STS Science Poster 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

Entries will be judged on their:

- originality and creativity
- communication of ideas
- presentation of information

The judges will be looking for entries that clearly communicate science ideas and that the technical language is appropriate for the age level of the entrants.

Category 2: Scientific Communication - Science Poster (Years K-2 only)

Entry guidelines

Tick that you have satisfied each of the requirements below.

Content

Your entry should include:

- entry label (attached to the back on the poster)

You are required to:

- relate to the theme
- give a clear explanation of the scientific and technical principles involved (refer to the diagrams you have used that help illustrate these principles). **All diagrams and text must be original.**
- write text using 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.)
- ensure written information is visible from one metre and headings visible from two metres.
- ensure diagrams have clear headings/labels and can be distinguishable from a distance of two metres.
- either hand draw or produce diagrams using tools on a computer. Diagrams copied from other software or downloaded are not acceptable. Scanned pictures, photographs of pictures and photographs are not acceptable on any part of your poster.

Presentation

Your poster should:

- be approximately A2 (42 cm x 59 cm – double A3) in size
- be done on flexible poster paper that can be easily rolled up
- not have any built-up or three dimensional sections.
- be laminated or covered in contact if diagrams or writing has been attached to the poster, so pieces don't fall off in transit.

Science Video

What is a science video?

Science videos entered into the STAWA STS Competition are videos or animations of 60 second duration that clearly explain a science idea. The videos/animations should be original work filmed in 2014.

Entries in this category will be judged by the category sponsor Edith Cowan University Faculty of Health, Engineering and Science.

Entries could also be entered into the Sleek Geeks Science Eureka Prize competition if they meet the entry requirements. Information about this competition can be found at <http://australianmuseum.net.au/making-your-sleek-geeks-video>. The website also contains hints, ideas and video galleries that could be useful when planning STS entries.

Producing a science video involves:

- selecting an idea or theory to video
- finding out about the topic and locating resources
- planning the script
- conducting a Risk Assessment*
- practising your script
- making your video
- editing your video
- producing your final copy of video

** It is important that a risk assessment is completed before conducting filming. A **Risk Assessment Form** is required to be submitted with the entry.*

A successful STS Science Video entry:

- has accurate science content based on the theme
- will communicate ideas clearly
- will contain good quality video footage

The judges will be looking for entries that clearly communicate science ideas and that the technical language is appropriate for the age level of the entrants.

Category 2: Scientific Communication - Science Video

Entry guidelines

Tick that you have satisfied each of the requirements below.

Content

Your entry should be submitted in an envelope (unless submitted online) and include:

- entry number included in the file name if submitted online or entry label attached to envelope if submitting on USB
- video on USB, if not submitted online (ensure entry number is written on USB)
- Risk Assessment Form (uploaded with entry or placed in envelope)

You are required to:

- relate to this year's theme.
- ensure your video does not simply display a technique used in science (e.g. how to safely light a Bunsen burner) but emphasises the **science** involved (e.g. why is the flame blue or yellow?).
- conduct a risk assessment before you film your video. You are required to complete a **Risk Assessment Form** and submit this form with your entry.
- ensure the video has opening and closing credits.
- ensure videos are 60 seconds or less in duration, including credits [max 1500 frames]. Any entries exceeding this limit will be disallowed.
- ensure entrant(s) and/or school name is included in the opening credits.
- ensure no corporate logos are visible during the video; this includes students wearing and/or displaying corporate logos. Remove or obscure labels/brand names from any commercial products used in the video. (School logos on uniforms are OK)
- ensure the use of 'extras' doesn't contravene the requirements of STS. With videos there will be times when 'extras' are called for either to act or hold the camera, so the entrants can appear in the recording. This does not contravene the entry requirements of STS as long as the student/s recorded on the entry form are the driving force behind the production and any help has not brought with it a level of presentation beyond the skills of the entrants in the group. *If you are going to enter your video into the **60 Second Science** competition you will need to check their guidelines as they are more stringent.*
- the preferred video format is MP4*.

** Each year a number of student entries are unable to be viewed due to incompatible formats. If a format other than MP4 is used there is a risk it may not be able to be viewed.*

*** It is preferable that videos are submitted online, however, if this is not possible then they should be saved on a USB.*

Scientific Photography

In the scientific photography section participants are asked to submit between three and six photographs which record some scientific event or illustrate some scientific phenomenon. The photographs must be linked by a common theme. The topic may be based on any scientific theme or you may use National Science Week theme for this year *Drones, Droids and Robots*.

Developing scientific photographs involves:

- selecting an idea or theme
- select subjects and location for photographs
- conducting a Risk Assessment*
- take photographs
- add any special effects or manipulation of photographs to help get the message across
- print photographs
- display photographs

** It is important that a risk assessment is completed before conducting taking photographs. A **Risk Assessment Form** is required to be submitted with the entry.*

A successful STS scientific photograph entry:

- has accurate science content.
- will communicate ideas clearly, each photograph expressing a single idea within the topic.
- will contain good quality photographs.
- will have the photographs displayed effectively
- will show creativity and originality.

Entries will be judged on their:

- originality and creativity
- communication of ideas
- scientific relevance of photographs
- impact of presentation

Category 2: Scientific Communication – Scientific Photography

Entry guidelines

Tick that you have satisfied each of the requirements below.

Content

Your entry should include:

- entry label attached to the top right-hand corner of title page
- written report following the headings described below
- Risk Assessment Form (if required)
- photographs

You are required to:

- provide three to six colour or black and white photographs on a science theme or idea of your choice.
- conduct a risk assessment before you take your photographs if using science equipment or you could be harmed whilst taking the photographs. Include a Risk Assessment Form with your entry.
- ensure all production work is your own including any special effects or manipulation. Commercial developing may be used.
- use any type of camera, including optical and digital.
- produce a written report (no more than 800 words) which includes:
 - **Title page**
 - **Aim** - *State clearly what you intended to do in terms of your topic and the photography.*
 - **Method** - *State clearly how you set up and took your photographs (images). Include information about the type of camera, other hardware and software you used and how you altered the images (if relevant).*
 - **Scientific Content** - *Describe the scientific principles or ideas you are displaying in your photographs and the relevance of the particular photographs you have selected.*
 - **Acknowledgements and references** - *All research is based on some background information therefore a reference list must be included. You should list the books, journals and websites you referred to and the people who gave you help or advice.*

Presentation

- Each photograph should be mounted on single sheet of light weight A4 card. No glass, wood or heavy frame or backing is permitted.
- Each mounted print should include a caption or short statement linking it to the entry title.
- STS entry number should be written on the back of each photograph.
- The photographs, entry form, written report and Risk Assessment Form (if required) should be submitted in a manila folder or envelope (not plastic).

Category 3: Engineering

Engineering is the application of Science, Mathematics and Technology to invent new products or modify existing products that benefit society.

Inventions are original applications of technology that solve a problem. The scope for inventions is limited only by your imagination. You are asked to apply your knowledge of science to make a working invention that has a practical application. Your invention may be a new device, method or process that has not existed before or you may choose to look at an existing device and invent a solution that works better.

Finalists in this category may be eligible for selection into the **BHP Billiton Science and Engineering Awards**.

Designing an engineering project involves:

- choosing a problem to solve
- researching ideas or gathering information to help you solve the problem
- sketching and writing down several ideas that satisfy your requirements.
- selecting and developing the idea that will best solve the problem.
- identifying any risks to yourself and others during the making and using of the model*
- making a model of your invention
- testing the model to see if it solves your problem
- evaluating your model to consider any improvements that could be made

** It is important that a risk assessment is completed before conducting the engineering project. A **Risk Assessment Form** is required to be submitted with the entry.*

A successful STS Engineering entry:

- will show creativity and resourcefulness
- will show skill in construction and design
- will communicate ideas clearly

Category 3: Engineering

Entry guidelines

Tick that you have satisfied each of the requirements below.

Content

Your entry should include:

- entry label attached to the top right-hand corner of title page
- written report following the headings described below
- Risk Assessment Form
- video on USB stick if not submitted online (ensure entry number is written on USB)

You must include with your invention a written report which includes the following parts.

- Title page and Table of contents**
- Summary** - *What gave you the idea? Explains how it solves a problem. Explains what is original or new about your idea.*
- Objective** - *Sets out the problem being solved. Explains its importance/relevance.*
- Unique characteristics** - *Explains why it is unique.*
- Advantages and limitations** - *Describes its the physical characteristics. Describe, in dot-point form, its the advantages and limitations.*
- Existing approaches** - *If there have been other approaches to the problem, list them with a brief description of the main reason why these are inadequate.*
- Sketches and diagrams** - *include sketches or drawings of your design.*
- Acknowledgements and references** - *A reference list must be included. You should list the books, journals and websites you referred to and the people who gave you help or advice. State the contribution of people who provided help and advise.*

Presentation

Written report

- When your report is finished ask your teacher or parent(s) to check your report to make sure it follows the guidelines.
- Your report should be typed on single sided A4 paper and stapled in the top left corner. The whole report may be placed in a plastic sleeve for protection. Do not bind or place in a presentation folder.

Video

A video, no longer than **THREE** minute in duration, of the invention in operation should be provided with your entry. The video should show:

- The problem you have chosen to solve. (i.e. how significant or complex the problem is)
- How it is used (i.e. ease of use)
- How it works (i.e. how well does it work)
- The design (i.e. is sturdy/well made or elegant)
- How well the invention addresses the problem.

*The preferred video format is **MP4**. Each year a number of student entries are unable to be viewed due to incompatible formats. If formats other than MP4 are used your video may not be able to be viewed.*

The quality of the video itself will play no part in the judging, however, it is important that the judges can see and hear the work to assess it fairly.

Working model

- Your design must be original. It must be safe to operate in a crowded area and must have appropriate safety features (e.g. boilers must have correctly operating safety valves). Dangerous chemicals must not be used and rocket type inventions will not be judged.
- Your model must be no larger than 0.76m (depth) x 1.22m (width) x 1.0m (height).

*Note: Finalists **MAY** be required to bring their working models to the awards presentation ceremony. **Working models should not be submitted with entries.***

Appendixes