

# WILSTON STATE SCHOOL



## SCIENCE COMPETITION HANDBOOK



# Wilston State School

## 2018 Science Competition

### HANDBOOK

1. An ENTRY FORM/DECLARATION must be attached to your entry when it is submitted for judging on Thursday, 20 September 2018 (Term 3, Week 10).
2. COMPETITION DIVISIONS:
  - Division 1: Prep and Years 1, 2
  - Division 2: Years 3, 4 and 5
  - Division 3: Year 6
3. ENTRY CATEGORIES:

Students may enter individually, with a partner, or as a group of three, provided that when two or more students work together, all are eligible for entry in the same division.

Entries must be in one of the following categories:

- A. Classified Collection
  - B. Scientific Investigation
  - C. Communicating Science
  - D. Mathematical Investigation
  - E. Models and Inventions
  - F. Environmental Action Project
4. REFLECTIVE JOURNAL

**A reflective journal should be kept and submitted with your entry.** A reflective journal is very important in showing the purpose/intent of the entry, and the way in which the question evolved and was tackled, as well as a record of how the work progressed (including the disasters).

A reflective journal should be kept as a record of what was completed on different days. It should contain accurate and detailed notes of your decisions, thought processes, and findings. It is expected that the journal be a series of **handwritten and sketched** ideas, **not typed or word-processed**. It may include photographs, graphs and tables, etc. A reflective journal helps you make sense of your science learning and helps the judging panel understand your reasoning. It should provide evidence that all group members (if appropriate) contributed to the entry.

Good notes show consistency and thoroughness to the judging panel. Acknowledge all sources of information with a bibliography.

Acknowledge all outside assistance received with explanatory notes, e.g., “Mum took the photographs, but I used PhotoShop to crop them, and then printed them off the computer.” Obviously, Prep and some Year 1 students will require adult assistance to keep a reflective journal.
  5. Prizes will be awarded for 1st, 2nd and 3rd placegetters in each division. Other entries may qualify for a Highly Commended award. In addition, separate prizes will be awarded for a ‘Young Scientist of the Year’ (Division 3) and a ‘Junior Scientist of the Year’ (Divisions 1 and 2). **Only Scientific Investigation entries are eligible for the Young/Junior Scientist of the Year prizes.**

6. Competition judging will take place as soon as the judging panel can be assembled after September.
7. All decisions of the judging panel are final and binding and no correspondence whatsoever will be entered into regarding these decisions.
8. SAFETY AND ETHICAL CONSIDERATIONS  
Students should ensure that their entries are conducted in a responsible and safe manner. For example:

Any entry involving experiments on living animals must follow the national guidelines at <https://www.nhmrc.gov.au/guidelines-publications/ea28> .

Entries involving blood products or other bodily fluids will not be accepted.

Entries involving micro-organisms will not be accepted.

Entries involving explosives, rocket fuels, detrimental to the environment, or potentially harmful to individuals will not be accepted.

Entries involving electrical experiments should not be in excess of 32 volts AC or 115 volts DC.

Entries involving illegal activities will not be accepted.

Students who are unsure as to whether or not their entry complies with the safety considerations should contact Mr Brendan Medlin (Science Teacher), [bmedl2@eq.edu.au](mailto:bmedl2@eq.edu.au)) for clarification before submitting their entry for judging.

## A. *Classified Collection:*

### **What to do:**

Plan and organise a collection of specimens that demonstrate a scientific principle or concept. The specimens should be displayed in an **organised** way: Collections might include any of the following:

rocks/minerals	magnets	bones	teeth
leaves	shells	fruits	seeds
trees	feathers	colours	pine
clouds	flowers	tracks	footprints
animals	eggs	birds' nests	insects

Students may use actual specimens, pictures, models or photographs in a collection.

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 The Environmental Protection Agency as protected species or collected from a protected area. The website address is <https://www.ehp.qld.gov.au/>. The Queensland Museum (<http://www.qm.qld.gov.au/>) can also advise on protected species.

Research relevant **scientific information** about the specimens and present it all in an interesting manner.

A reflective journal should be kept and submitted with your entry.

### **What makes a winning entry?**

Well preserved and presented specimens along with clearly set out research. Winning entries explain how the specimens have been organised, and where appropriate, refer to scientific systems of classification (taxonomy, dichotomous key or listing of characteristics). The best entries are organised in a logical way, have clear explanations about the specimens and the way they are organised, and make clear links to the scientific principles or concepts they demonstrate.

### **Judging criteria:**

Does the reflective journal show the planning and intent of the collection? Is there a list of people and sources that have helped the student?

Are specimens sorted into groups to show similarities and differences? Are features or properties of each group and the overall collection identified?

What relationships does the collection identify?

Is the information about the collection relevant, correct and age appropriate?

Does the way the specimens are classified lead to an understanding of the scientific concepts involved?

Is the reasoning behind the choice of the classification system clearly evident?

Does the collection present a personal illustration of the scientific concept?

Does the presentation of the specimens show them to their advantage and display the variations?

Has thought and time been invested in the collection?

## **B. Scientific Investigation:**

### **What to do:**

Choose a topic or question to investigate (there are no restrictions), and ask what, why, and how questions, do some research on the topic, and discuss your ideas. Keep a day-by-day reflective journal that explains what you do and why. 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. Include any references and acknowledge the assistance you receive.

Topics might include any of the following:

- Which brand of battery lasts longer?
- What colour fades fastest?
- What type of paper towelling is most absorbent?
- Does plaiting make rope stronger?
- What foods contain starch/fat/sugar?
- What materials are the best conductors of electricity?
- How does exercise affect your heartbeat?
- How important are your thumbs?
- How does a person's height compare with their arm spans
- What do plants need to grow?
- Which foods grow mould very quickly?

### **What makes a winning entry?**

An interesting topic or question and clearly set out research. Winning entries explain why the question is important to investigate; how it is possible to find a solution to the problem, and how you went about finding the solution to the problem.

The report includes:

1. Question or topic investigated
2. Hypothesis
3. Materials
4. Procedure
  - (i) Determination of variables to control
  - (ii) Fair testing steps
5. Results
  - (i) Observation
  - (ii) Measurements, graphics and text
6. Discussion - what the results mean referring to hypothesis and anything unexpected that happened.
7. Conclusion - ideas on how the research could be modified

A reflective journal should be kept and submitted with your entry.

### **Judging criteria:**

Does the reflective journal show the planning and intent of the entry and the quality of the student's thinking?

Does the entry demonstrate the use of scientific method?

Has the student investigated the question or topic in a systematic and scientifically valid way?

Is there adequate data to support the conclusion?

Is the conclusion consistent with the aim of the investigation?

### C. *Communicating Science:*

#### **What to do:**

Present a science communication medium (a poster, PowerPoint presentation, video/DVD, game, website, cartoon/comic strip or a model) to demonstrate or explain a scientific principle or concept. Topics might include any of the following:

water cycle	rainforest	solar system	life cycle
eye	gravity	moon	battery
respiratory system	paddle boat	star	electricity
brain	hovercraft	planet	parachute
volcano	hot-air balloon	skeleton	forces

Your entry must include a written report or poster (max. length 500 words) describing:

- What is the scientific principle or concept being demonstrated or explained?  
e.g. How the eye works?  
Why is the sky blue?
- Include your background research information, references and permission to use copyrighted material (if applicable)
- How the presentation or model “works” or what it does/shows in scientific terms
- How the presentation or model was developed or constructed
- Difficulties you experienced
- Programs you have used to create your presentation or website (if applicable).

You can use graphics, video, sound and animations. Models can be stand-alone or a diorama. Electronic entries should be saved to a USB device. Acknowledge all sources – no materials with copyright to other persons/organisations are permitted.

A reflective journal should be kept and submitted with your entry.

#### **What makes a winning entry?**

Clear documentation and a strong link to science is required. Requirements include a comprehensive report or poster and reflective journal describing the design and process used to create the entry.

#### **Judging criteria:**

Does the reflective journal show the planning and intent of the entry and the quality of the student’s thinking?

Does the entry demonstrate and/or explain the scientific concept the student chose?

Does the entry present evidence of effective background research, references and permission to use copyrighted material (where applicable)?

Does the entry identify and describe the target audience?

Does the entry effectively demonstrate visual appeal, creativity and innovation?

#### **D. Mathematical Investigation:**

##### **What to do:**

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

- written report, story, poem, play, diary, brochure or pamphlet
- poster
- video or DVD
- model
- game
- computer disc or USB device

Investigate the mathematical content of a specific interest (e.g., mathematics in basketball or budgeting for a holiday). Excursions (e.g., zoo, museum, historical village), current events, special celebrations, or topics covered in class (*iMaths* investigations) can also provide a useful source and motivation for entries.

A reflective journal should be kept and submitted with your entry.

##### **What makes a winning entry?**

Suitability of topic, clarity of question posed, range, depth and integration of mathematical concepts and processes; communication, creativity and originality; the extent to which the conclusions answer the question and presentation.

##### **Judging criteria:**

Has the mathematical concept behind the entry clearly identified?

Has sufficient high-quality information about the mathematical concept been presented in the entry?

Has the student contributed and synthesised their own information rather than merely presenting information from other sources?

Does the student show an understanding of the concept rather than merely mentioning it in passing?

Does the entry present a novel or ingenious way of illustrating the mathematical concept?

## **E. Models and Inventions:**

### **What to do:**

At the broadest level, innovation is about generating new ideas and applying them in the form of new products, processes and services for commercial use or social well-being. Innovation is a way of perceiving and responding to the problems of the world we live in.

Develop and present your new idea to solve a problem or a technological solution to an issue. Present it as a design and a model/invention.

The model/invention needs to be clearly explained as to how it works or will work and what it does.

Models/inventions may include any of the following:

mouse trap	fly trap	new fasteners
solar cooker	cockroach trap	hot water system
all-weather umbrella	new hair clip	non-slip shoes
musical instrument	hat that stays on head	
cheese cutter	new clothes hanger	

Create a poster to accompany the entry that documents:

- What is the model/invention?
- The scientific concept or principle that is demonstrated
- How the model/invention was built
- What problems were encountered and how they were overcome

Acknowledge all sources - no materials with copyright to other persons or organisations are permitted.

A reflective journal should be kept and submitted with your entry.

### **What makes a winning entry?**

Unique and interesting models/inventions with clearly set out supporting information. Winning entries show resourcefulness, innovation and originality. They are sturdy and easy to use, and clearly demonstrate the scientific principle or concept intended. The best entries make clear links to the stated purpose, are safe, interesting and informative.

### **Judging criteria:**

Does the model/invention clearly demonstrate a specific identified need or scientific concept(s)? Does the student show an understanding of the concept rather than merely mentioning it in passing?

Is the design original and well considered?

Have the most suitable materials available been used? Have students gained access to appropriate equipment to construct their model/invention (e.g. woodworking, metalworking shops and appropriate expert help if required)?

Is the model/invention easy for the judge to use in the intended way? Has the model/invention been constructed safely and is it safe to use?

Is the model/invention appealing to see with a neat, clean finish? Is information clearly presented on the poster? Is the information on the poster understandable and easy to read?

Does the reflective journal outline the design and production of the model/invention? Has the invention been evaluated or value of the model/invention been established?

Have all contributions of assistance been acknowledged?

## **F. Environmental Action Project:**

### **What to do:**

Scientifically investigate an environmental issue in the local area, collect and analyse data about the problem, draw conclusions and make suggestions for improvement. Choose a topic or question to investigate, and ask what, why, and how questions, do some research on the topic, and discuss your ideas. Design and conduct an investigation to gather information about the topic or question (Refer to Scientific Investigations). Present a report to tell others what you did, what you found, and how you went about resolving the problem.

Choose the medium to present your project. It could be a poster, board game, research project, invention, drama or musical production or even a video, DVD or website.

A reflective journal should be kept and submitted with your entry.

### **What makes a winning entry?**

An interesting topic or question and clearly set out research. Winning entries explain why the question is important to investigate; how it is possible to find a solution to the problem, and how you went about finding the solution to the problem. The report includes details of the observations, measurements and anything unexpected that happened; what the results or the research mean; ideas on how the investigation could be modified next time, and excellent presentation.

### **Judging criteria:**

Has the student clearly identified the environmental issue they are concerned about?

Has the student demonstrated a sound understanding of the environmental issue?

Has the student investigated their issue in a systematic and scientifically valid way?

Is there adequate data to support the conclusion?

Is the conclusion consistent with the aim of the investigation?

Has the student demonstrated active involvement in their environmental issue at a practical, local level?

Is the project visually appealing, creative and easy to follow?

Is the text well written and easily understood?

Have illustrations/diagrams/maps, etc. been used to convey information in a clear and interesting way?

Have all sources of assistance been acknowledged appropriately?



# Wilston State School 2018 Science Competition ENTRY FORM/DECLARATION

An ENTRY FORM/DECLARATION must be attached to your science competition entry. Entries are not required for judging until Thursday, 20 September 2018.

Name(s):			
Class:			
Title of entry:			
Description of entry:	<input type="checkbox"/> Display folder, exercise book, etc. <input type="checkbox"/> USB, CD/DVD, etc. <input type="checkbox"/> Poster <input type="checkbox"/> Model, invention, etc. <input type="checkbox"/> Other _____ <i>Please list all components of the entry.</i>		
Division:	<input type="checkbox"/> Division 1 (Prep - Year 2)	<input type="checkbox"/> Division 2 (Years 3 - 5)	<input type="checkbox"/> Division 3 (Year 6)
Category:	<input type="checkbox"/> A. Classified Collection <input type="checkbox"/> B. Scientific Investigation <input type="checkbox"/> C. Communicating Science	<input type="checkbox"/> D. Mathematical Investigation <input type="checkbox"/> E. Models and Inventions <input type="checkbox"/> F. Environmental Action Project	
<b>Parent/Carer Permission:</b> I have read and agree to accept, the Conditions of Entry as stated. I give my permission for the student named on this entry form to participate in the 2018 Science Competition. I understand that no correspondence will be entered into regarding adjudication decisions.  Signature(s): _____  Name(s) (please print): _____  Date: _____  <input type="checkbox"/> I give/do not give permission for the entry to be placed on display for one week in the school library during Term 4.			

<b>Declaration:</b> I declare that the entry is my own work, except where outside assistance has been acknowledged. All sources of information have been listed in a bibliography.  Entrant: Signature: _____  Name (please print): _____  Date: _____  Parent/Carer: Signature: _____  Name (please print): _____  Date: _____
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Please read the CONDITIONS OF ENTRY in the *Wilston Science Competition Handbook*.