

# 2017 MATHS TALENT QUEST

WHAT IS A MATHS INVESTIGATION?



# MATHSTALENTQUEST

KEY DATES - 2017	
Registration Opens	Tuesday 18 April 2017
Registration Closes	Friday 28 July 2017
Delivery of entries at La Trobe	Wednesday 23 August 2017
Judging of MTQ Entries	Thursday 24 – Tuesday 29 August 2017
Display of MTQ Entries	Wednesday 30 August 2017
MTQ Awards Ceremony	Thursday 19 October 2017



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## WHAT IS A MATHS INVESTIGATION?

- An investigation may be defined as a situation originating in mathematics or the real world which lends itself to inquiry
- A mathematics investigation allows students to examine situations using various techniques and in the process of their exploration, develop skills that can be applied to other problems



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## WHY DO A MATHS INVESTIGATION?

- It caters for student diversity, investigative work being viewed as a key way to engage and motivate learners
- Students need to formulate their own questions from a given situation. This process provides teachers with a clear indication of their level of knowledge and understanding of the topic
- It requires students to use mathematical processes to understand the situation. It also allows students to generate first hand data
- Students develop a systematic record of their own work rather than just an end product. Allows teachers to see the process incurred



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## RELEVANCE OF THE AUSTRALIAN CURRICULUM & AUSVELS

- MTQ Projects and Investigations address all three Australian Curriculum content stands:  
Number & Algebra, Measurement & Geometry, Statistics & Probability
- As well as ensures students work with the four Australian Curriculum proficiency stands:  
Understanding, Fluency, Problem Solving and Reasoning



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## THE AUSTRALIAN CURRICULUM & AUSVELS - CONTINUED

- The four proficiency strands reinforce the significance of working mathematically within the content and describe how the content is being explored or developed
- The curriculum anticipates that schools will ensure all students benefit from access to the power of mathematical reasoning and learn to apply their mathematical understanding creatively & efficiently
- Using mathematical skills across the curriculum both enriches the study of other learning areas and contributes to the development of a broader and deeper understanding of numeracy
- It encourages teachers to help students become self-motivated, confident learners through enquiry and active participation in challenging and engaging experiences



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## DEVELOPING YOUR INVESTIGATION – FIRST DECIDE

- **Who will be completing the investigation?**  
Class (maximum of 30 students), Group (maximum of 6 students) or an individual.  
Those completing their investigation in a group or class setting, consider creating smaller groups (writers group, research group, calculator group) and assigning specific tasks
- **What will the investigation be?**  
A home investigation, a school investigation or a combination of both
- **Which investigations will be entered into the competition?**  
Each school investigation will be entered or our own school judging will occur to decide.  
Please note that a maximum of 8 entries per year level will be accepted for state judging.  
Some schools host a school expo to display their students work to parents and students



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## GETTING STARTED

- Use mind mapping, brainstorming and lateral thinking
- Brainstorm ideas and inspiration for investigation
- Generate ideas for topic and related mathematical content
- Select a topic and outline investigation content
- Ensure acquisition and management of resources
- Develop a plan/timeline and consider presentation format





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**MATHS TALENT QUEST PLAN**

Members of our group...

Names \_\_\_\_\_

What we would like to do for our project...

Presentation format \_\_\_\_\_

What we want to find out and how we will show our

Aim \_\_\_\_\_

What maths will we use!!

— Add to this as you go.

—

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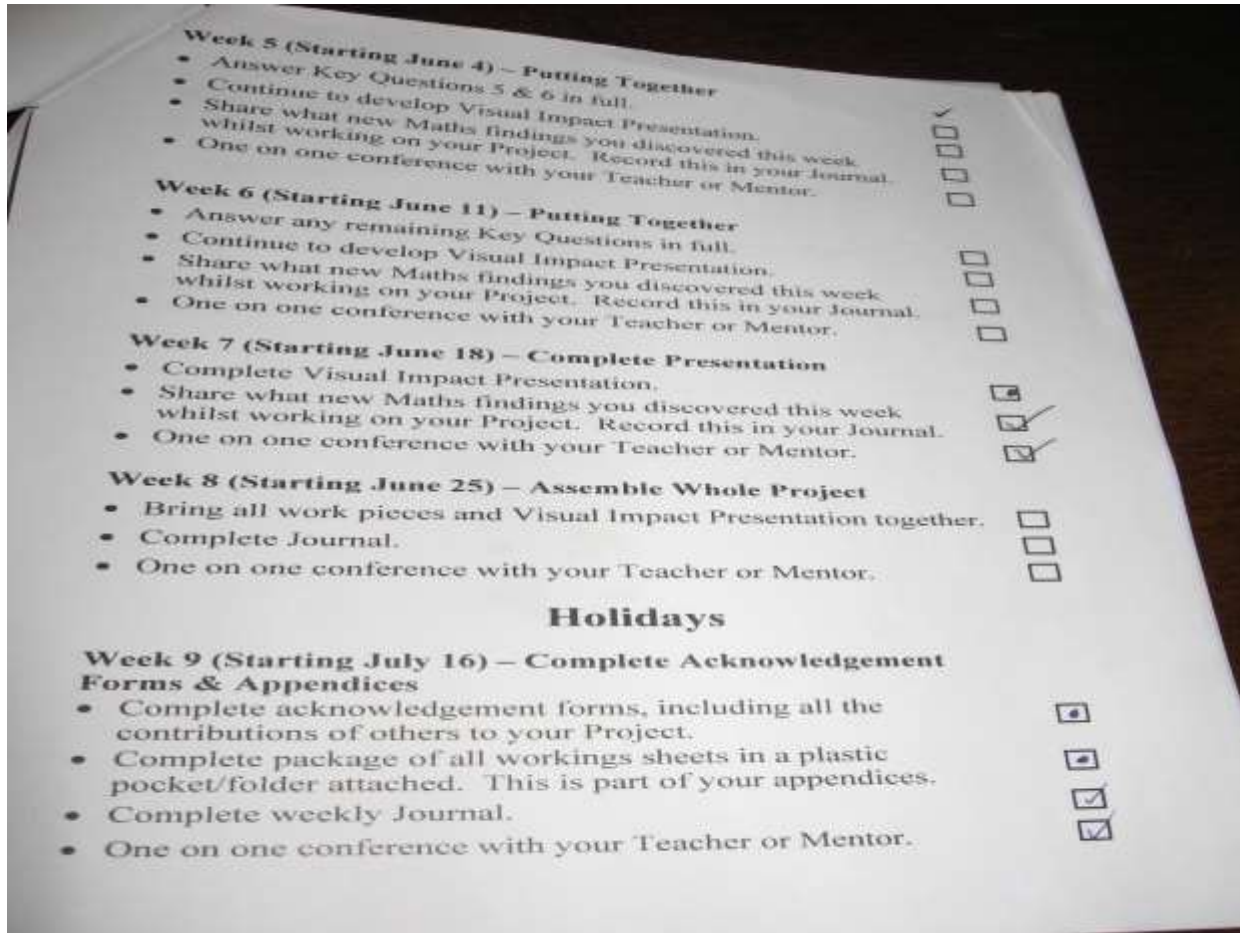
Other information about our project!

How you are going to manage the organisation of your group or class?

## EXAMPLE OF A MATHS TALENT QUEST PLAN



# MATHS TALENT QUEST

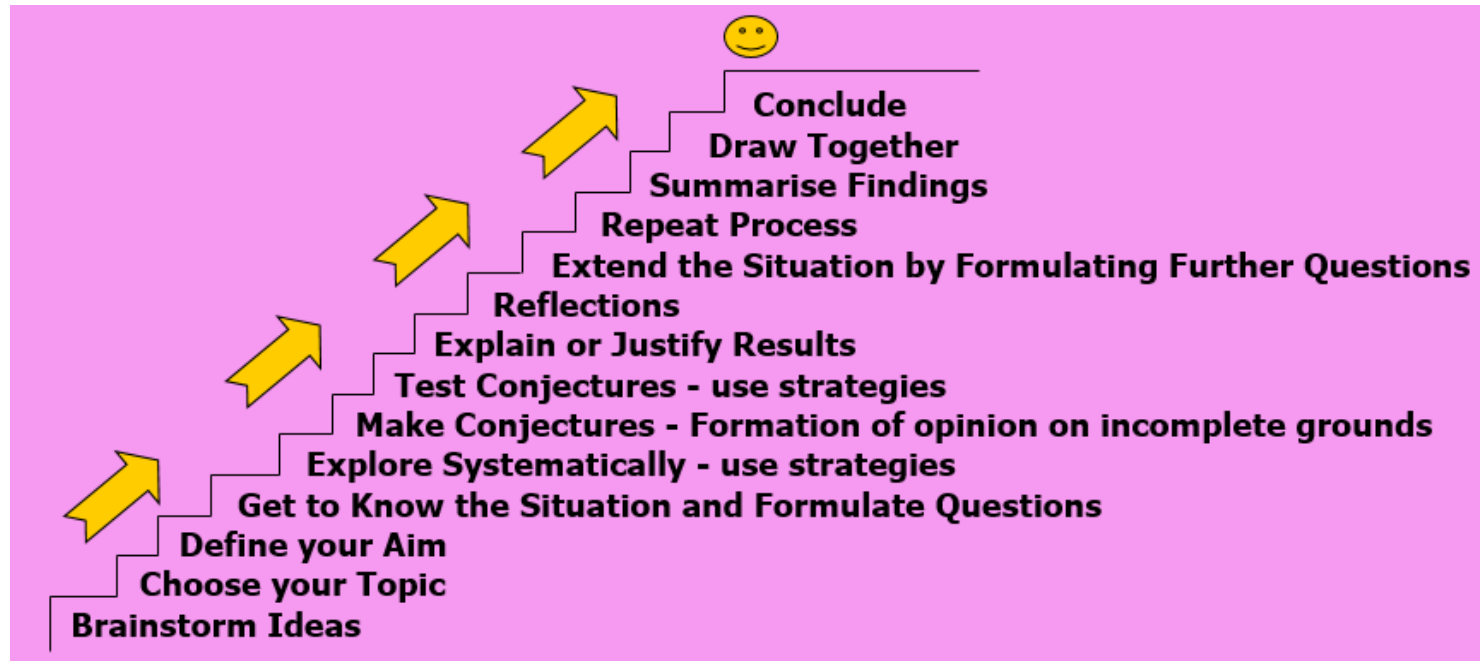


## EXAMPLE OF A MATHS TALENT QUEST TIMELINE



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## INVESTIGATION STEPS



A question becomes a problem if the procedure or method of solution is not immediately known, but requires you to apply creativity and previous knowledge in new and unfamiliar situations. If the procedure or solution is obvious then it is not a problem but an exercise



# MATHS TALENT QUEST

## INVESTIGATION STEPS - CONTINUED

1. **See** – Understanding the problem
2. **Plan** – Deciding on a strategy or plan
3. **Do** – Solving the problem
4. **Check** – Checking your results



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## 1. SEE – Understanding the Problem

- Identify the problem you want to answer
- Read the problem carefully
- Pick out various parts of the problem

### QUESTIONS TO CONSIDER

- What is the problem asking me?
- Are there any words I don't understand?
  - What do I already know?
  - What am I trying to do?



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## 2. PLAN – Deciding on a Strategy or Plan

- Gather together all available information
- Make some predictions or guesses
- Think about the different strategies you may use
- Decide what strategies will suit your problem
- Write down your plan

### QUESTIONS TO CONSIDER

- How am I going to solve the problem?
- Have I seen a similar problem before?
  - How can the known help me with the unknown?
  - Can I restate the problem?



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## STRATEGIES FOR SOLVING UNFAMILIAR PROBLEMS

- Trial and error
- Guessing, checking and improving
- Gathering data
- Drawings, diagrams and graphs
- Working backwards
- Looking for patterns
- Writing an equation
- Using a formula
- Simplifying the problem
- Comparing with similar problems
- Elimination of possibilities
- Using a list, table, materials and models
- Acting it out
- Test conjecture



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## 3. DO – Solving the Problem

- Work through one step at a time
- Complete each step carefully
- Explain and show how you reach your answer
- Reflect on where you are at
- Rethink and modify your strategies as needed
- Create a new plan if necessary

### QUESTIONS TO CONSIDER

- What do I do next?
- Have I proved I am correct?
- Do I continue with my plan?
  - Is my plan working?
- Do I need to change my plan?





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## MATHEMATICAL PROCESSES THAT CAN BE USED

- Questioning
- Generalising
- Exploring
- Collecting Data
- Analysing
- Predicting
- Reflecting
- Hypothesising
- Comparing
- Classifying
- Justifying
- Interpreting
- Proving
- Experimenting
- Estimating



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## 4. CHECK – Checking your Results

- Think carefully and examine your answer
- Write your answer in complete sentences

### REFLECTIONS AND SELF ASSESSMENT

- How could the problem relate to other problems?
- I there another strategy I could use to get the answer?
- How can I use this method to solve further problems?

### QUESTIONS TO CONSIDER

- How can I check my result?
- Have I used all the important information?
  - Does the answer make sense?
  - Does it answer the whole problem?



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## REFLECTION QUESTIONS AND STATEMENTS

- I have learnt ...
- I have found ...
- I have discovered ...
- I now need to ....
- Today I/ Tomorrow I ...
- Something new ...
- Something challenging ...
- Further thoughts ...
- Can I check this another way?
- What happens if?
- How many solutions?
- What else can I learn from this?



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## GRADE FOUR REFLECTION OF LEARNING



# MATHS TALENT QUEST

**COMMUNICATION**

*Your introduction :*

- A clear aim explaining what your project is investigating
- The questions you are setting out to answer.
- An explanation of how you plan to find out your information.

*Your results and understandings*

- Correct mathematics calculations ( show your working out)
- Correct mathematics words and symbols
- Strategies explained – how and why you got your solutions (The strategies used from your problem solving tool kit)
- An explanation of what your results prove.
- Consideration of what could have been done differently.

*Your Learning Journal*

- A record of what you did each week.
- What was easy and what was a challenge.
- What could have been done differently / better.
- What you enjoyed and what you learnt each step of the way.

Score out of 12 = 7

Tick the box if you think your project includes these things.

**ORIGINALITY**

*Your Resources*

- Obvious evidence of the resources you used in your project and when you used them.
- A Reference list at the end
- Acknowledgements : A list at the end including the teachers, parents who assisted you and how they supported you.
- An original project idea that interests you and your audience.

**PRESENTATION**

*Visual Impact*

- Neat, well set out results.
- A clever title that will grab attention.
- A well organised / clearly presented project that captures the interest of your audience.
- Your maths skills are clearly displayed.

Score out of 8 = 8

Name:

## EXAMPLE OF A SELF ASSESSMENT/ REFLECTION



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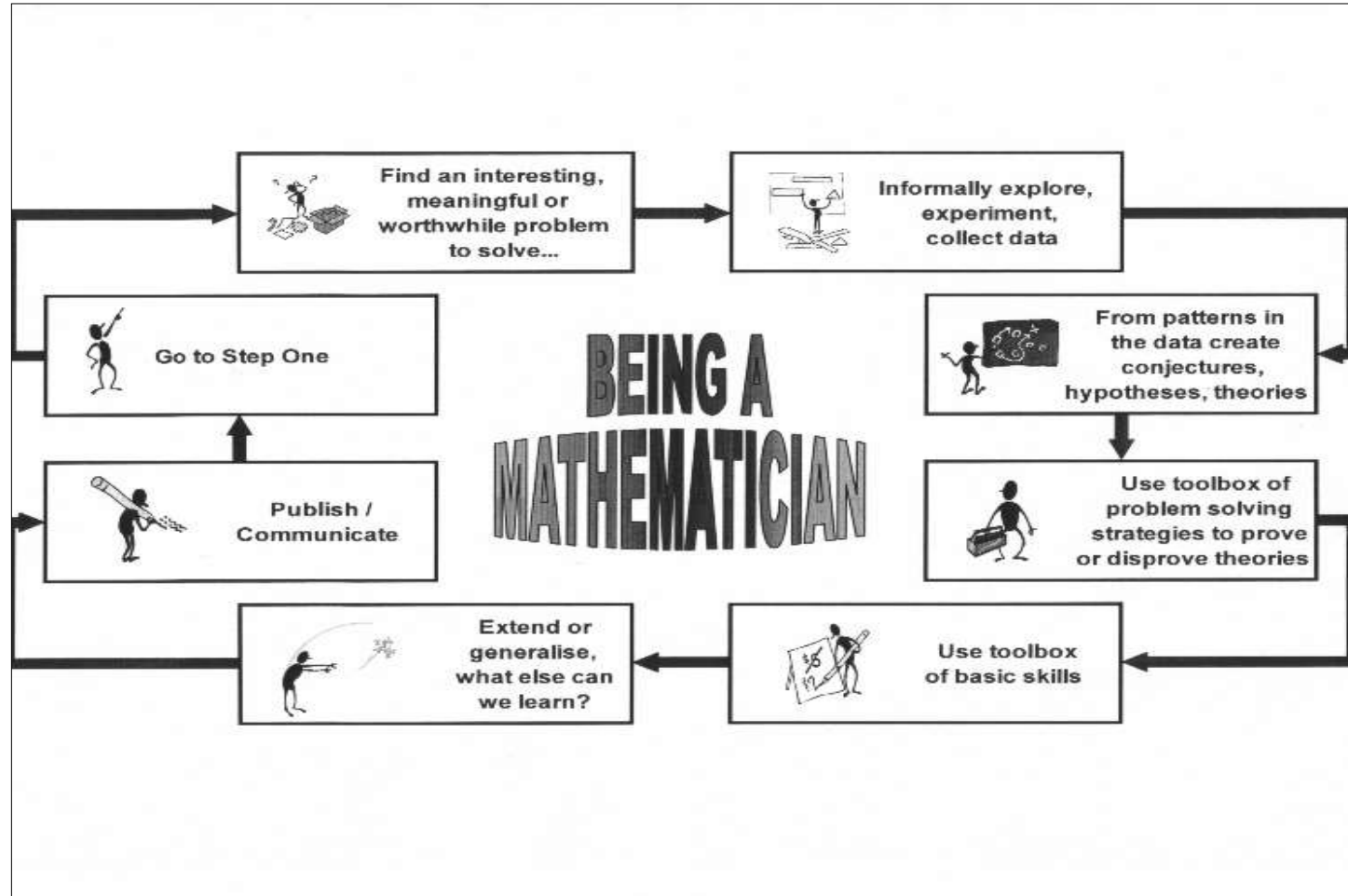


## JUDGING RUBRIC

- The Judging Rubric can be downloaded from The MAV website



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**FURTHER  
RESOURCES  
AVAILABLE AT:**  
[www.mathematicscentre.com](http://www.mathematicscentre.com)



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**“Mathematics is not a careful march down a well cleared highway, but a journey into a strange wilderness, where the explorers often get lost and discover more than they thought possible”**

**W. S. Anglin**





# FURTHER INFORMATION

- Please visit the MTQ website to download additional documents

<https://www.mav.vic.edu.au/student-activities/maths-talent-quest.html>

- Attend an MTQ Professional Development workshop – dates can be found above link
- Contact MTQ Education Consultant: Jennifer Bowden ([jbowden@mav.vic.edu.au](mailto:jbowden@mav.vic.edu.au))
- Contact MTQ Event Manager: Jacqui Diamond ([jdiamond@mav.vic.edu.au](mailto:jdiamond@mav.vic.edu.au))
- Phone the MAV Office on 9380 2399

