MASA Junior Secondary Mathematics Enrichment Project (JSMEP)
and South Australian Mathematics Talent Quest (SAMTQ) 2022

Jointly sponsored by

The Department for Education (JSMEP)
and
The Mathematical Association of SA (SAMTQ)

The Junior Secondary Mathematics Enrichment Project and The South Australian Mathematics Talent Quest (JSMEP/SAMTQ) are annual activities aimed at promoting interest in mathematics. The focus of JSMEP/SAMTQ is on students using their mathematics to conduct a mathematical investigation.

JSMEP/SAMTQ is open to all primary and secondary students. Students select their own investigation topic based on their personal learning interests and apply mathematics in context. They understand and discover how mathematics is used and can be found in the world around them, providing a positive experience that reduces the barriers to learning in mathematics.

The **key considerations** of the Australian Curriculum: Mathematics describe the proficiencies in mathematics that enable students to respond to familiar and unfamiliar situations by employing mathematical strategies to make informed decisions and solve problems efficiently. The breadth of opportunities that teachers can plan for, and the interdependent actions in which students can engage when developing mathematical proficiency include investigations and mathematical modelling

Numeracy in the Australian Curriculum: Mathematics has a central role in the development of numeracy in a manner that is more direct than is the case in other learning areas. It is important that the mathematics curriculum provides the opportunity to apply mathematical understanding and skills in other learning areas and to real-world contexts.

The modern world is influenced by ever expanding computer power, digital systems, automation, artificial intelligence, economics, and a data driven society. This leads to the need for an increased **Science, Technology, Engineering and Mathematics (STEM)** workforce. Mathematics is not only integral to quantifying, thinking critically and making sense of the world, it is central to building students' pattern recognition, visualisation, spatial reasoning, and computational skills, which are essential to STEM.

What better way to allow your students to develop and show these capabilities and proficiencies than giving them the opportunity to undertake a mathematical investigation, use mathematics to solve a real-world problem, create a mathematical artefact or research a mathematical idea?

1.   BACKGROUND AND INTRODUCTION

The aim of this project is to involve students, regardless of their levels of mathematical experience, in a cooperative and enjoyable project/investigation activity of their choice. Participants will gain invaluable experience in areas that SACE mathematics (and other subjects as well) demand, for example, directed investigations, project work and a literacy requirement. By undertaking an investigation, they are demonstrating many of the capabilities and proficiencies required by the Australian Curriculum.

2.   POSSIBLE PROJECTS

Students may choose **any** area of interest, provided there is **a clear evaluation of the mathematical content** in the chosen activity. For example, a conclusion in a statistics project or an evaluation in a game entry.

Class teachers can give students ideas and inspiration as well as a timeline for preparation. The MASA website has several examples to assist teachers in directing students to possible topics

For example:
Students could be encouraged to investigate a particular theme following formal class lessons in that area.

Another approach may be to use the "Find out all you can about ..." approach to initiate brainstorming.

An excursion to a building site, farm, factory, supermarket or courtroom may provide useful ideas and motivation.

Students may wish to investigate the mathematics of their particular interest: sport, recreation, spending money, watching television, computing applications, informatics to name a few.

3.   WHAT IS INVOLVED?

Schools should note that:

- o Entry is free and open to all students from R – 12.
- o At each year level there are three categories – Individual, Small groups (up to 5 students) and Class
- o Schools should involve as many students as possible, effectively running their own competition. Schools select the entries they wish to submit. There is a **limit of three entries, per category, per year level per school.**
- o Schools will need to complete a registration form and submit it to MASA by Friday 8 July 2022.
- o All JSMEP/SAMTQ entries must be sent to The Mathematical Association of South Australia (MASA) by Friday 19 August 2022 before 5pm.
- o Schools will be notified of the results and if their entries have been selected to be sent for National Judging. Only projects delivered in a digital format can be considered for judging in the National Maths Talent Quest. Digital format can include, pdf, PowerPoint, video link or digital photo files.
- o To recognise all the students involved, MASA will provide participating schools with Participation Certificate templates for all participating students.

NB Outstanding entries may be entered in the AAMT National Mathematics Talent Quest

4.   ENTRY DETAILS

This project is open **FREE of charge** to all students, regardless of their levels of mathematical experience, from years R to 12. Entries may be from individuals, groups of at most five members, or from classes (which may involve six or more students).

Entries must reach the MASA office by Friday 19th August 2022. https://www.masanet.com.au

All entries submitted for judging should be in a digital format and accompanied by the appropriate cover sheet and should have the following information.

- a. Project title
- b. Student name/s
- c. Student year level
- b. A Report which should include, as appropriate, discussion of:
  - composition and formation of group if appropriate (individual, group,class)
  - selection of topic
  - any changes of ideas
  - ideas for improvement
  - conclusions
  - benefits gained
- c. Acknowledgment of any assistance by adults (including teachers) in the preparation of the entry for submission.
- d. A Bibliography listing all references used in researching the project.
- e. There is no upper or lower limit on the 'length' of entries, but material should be relevant and not mere 'padding' for effect.

5.   IMPORTANT DATES

Registration: 8 July 2022

Entries Submitted   19 August 2022
**   https://www.masanet.com.au**

Presentation Ceremony to be held on 24 October 2022

Office:
        The Mathematical Association of South Australian Inc
        80 Payneham Road, Stepney 5069
        https://www.masanet.com.au

Postal Address:
        The Mathematical Association of South Australian Inc
        P.O. Box 94
        Stepney   5069

6.   JUDGING OF ENTRIES - Guidelines for Schools

All entries will be judged **for cash prizes** on following aspects of the chosen projects:

    Choice of topic
    Investigative processes
    Communication of findings
    Mathematical processes
    Creativity
    Acknowledgement
    Evidence

For more details, check the JSMEP/SAMTQ Rubric at the MASA Website.

- Winning entries may be required for general display at future promotional activities of MASA.
- It is the responsibility of the entrants to supply all required hardware & software for judging purposes. Entrants may use programming, spreadsheets, data base, word processing or any other multimedia formats. Please contact the MASA if you have any queries.
- The judges' decision will be final, and no correspondence will be entered into.
- Prizes may not be awarded in a category if Judges deem the standard of entries to be inadequate.

7   SACE ASSESSMENT TYPE 2: MATHEMATICAL INVESTIGATION

In a secondary context, in anticipation of students doing SACE Mathematics in future years it may be useful that the Investigation be like a mathematical investigation as required for assessment by the SACE Board at Stages 1 and 2. (Years 11 and 12)

The following notes are included as a guide in line with the SACE Board requirements.

Students investigate mathematical relationships, concepts, or problems, which may be set in an applied context. The subject of a mathematical investigation may be derived from one or more subtopics, although it can also relate to a whole topic or across topics.

A mathematical investigation may be initiated by a student, a group of students, or the teacher. Teachers may give students a clear, detailed, and sequential set of instructions for part of the investigation or to initiate the investigation, or may provide guidelines for students to develop contexts, themes, or aspects of their own choice. Teachers should give some direction about the appropriateness of each student's choice, and guide and support students' progress in a mathematical investigation.

A mathematical investigation may provide an opportunity for students to work collaboratively to achieve the learning requirements. If an investigation is undertaken by a group, students explore the problem and gather data together to develop a model or solution individually. Each student must submit an individual report.

Students demonstrate their problem-solving strategies as well as their knowledge, skills, and understanding in the investigation. They are encouraged to use a variety of mathematical and other software (for example, Computer Algebra Systems, spreadsheets, statistical packages) to assist in their investigation. The generation of data and the exploration of patterns and structures, or changing parameters, may provide an important focus. From these, students may recognize different patterns or structures. Notation, terminology, forms of representation of information gathered or produced, calculations, technological skills, and results are important considerations.

Students complete a report on the mathematical investigation. In the report, they interpret and justify results, draw conclusions, and give appropriate explanations and arguments. The mathematical investigation may provide an opportunity to develop and test conjectures.

In the report, they formulate and test conjectures, interpret and justify results, draw conclusions, and give appropriate explanations and arguments.

The report may take a variety of forms, but would usually include the following:
- an outline of the problem and context
- the method required to find a solution, in terms of the mathematical model or strategy used
- the application of the mathematical model or strategy, including:
  – relevant data and/or information
  – mathematical calculations and results, using appropriate representations
  – the analysis and interpretation of results, including consideration of the reasonableness and limitations of the results
- the results and conclusions in the context of the problem.

A bibliography and appendices, as appropriate, may be used.

The format of an investigation report may be written or multimodal.

Conclusions, interpretations and/or arguments that are required for the assessment must be presented in the report, and not in an appendix. Appendices are used only to support the report, and do not form part of the assessment decision.