

National Literacy and Numeracy Week 2009 Project Report

Project title: Stage 4 Mathematics Challenge

Project description:

Schools are invited to enter one or two teams of students from Years 7 and 8. Each team consists of 4 students and a supervisor. Several of these teams of students will come from small rural schools and this is one of the few times they will meet for academic purposes with students from other schools.

Teams complete four different “challenges” during the day. These events are completed as a team.

The content is connected to the NSW Mathematics syllabus and focuses on the processes of Working Mathematically.

The first activity involves the strands of Space and Geometry, Data, Number and Measurement.

The second activity is called the “Swiss Competition” and is essentially a Patterns and Algebra activity.

The third activity draws on knowledge from all of the strands of the Mathematics syllabus.

The final activity is a tabloid of Space and Geometry activities which involve the use of concrete materials.

Person responsible for project:

Leslie Casey, Mathematics Consultant 7 - 12

School, region, diocese:

Riverina Region, Griffith Regional Office

Contact person’s email:

leslie.casey@det.nsw.edu.au

Number of students, teachers, parents, other community members directly involved:

4 Events

Cootamundra Challenge

15 teams of Stage 4 students totalling 60 students from 5 schools including 2 rural and remote schools.

12 students supervisors of teams

8 parents

8 teachers + Principal of school

Wagga Wagga Challenge

21 teams of Stage 4 students totalling 84 students from 7 schools, including 1 rural and remote school.

8 student supervisors of teams,

8 parents,

8 teachers.

Leeton Challenge

19 teams of Stage 4 students totalling 76 students from 9 schools including 4 rural and remote schools.

8 students supervisors of teams

5 parents

12 teachers

Corowa Challenge

16 teams of Stage 4 students totalling 64 students from 4 schools including 2 rural and remote schools.

10 students supervisors of teams

2 parents

5 teachers

The Challenge planned to be held at Hillston, has been postponed and will be run via the Connected Classroom Facility to enable more rural and remote schools to participate.

Intended literacy and/or numeracy outcomes:

Students will:

- engage with a variety of mathematical activities which are both fun and challenging;
- work as a team, using a variety of problem solving strategies to complete unfamiliar problems in practical situations;
- communicate mathematically and use mathematical metalanguage in response to the activities; and
- engage with concrete materials in order to solve problems in unfamiliar situations.

Teachers will:

- improve their understanding of the Working Mathematically processes , and how to develop these processes with students; and
- become aware of concrete materials that will support students' learning in Mathematics.

Parents will:

- understand the diversity of Mathematics and that many situations involve Mathematics despite first impressions; and
- develop an understanding of problem solving and that mathematics is more than completing a series of routine questions from a textbook.

Evidence of achievement of intended literacy and/or numeracy outcomes:

- Students completed unfamiliar activities and were given guidance in using a range of problem solving strategies.
- Students worked as a group to solve problems, and those who worked most co-operatively had the most success, as they were able to complete more activities in the time allowed.
- Concrete materials were available for many of the activities, and students willingly used this to understand the problems, and to find possible solutions to the problems.

Outcomes for teachers include:

- Understanding their students weaknesses in problem-solving,
- The need to explicitly teach problem-solving strategies, to give students more choices when tackling problems.
- Understanding that students become more engaged in activities if there is a real-world situation rather than routine textbook activities
- A participating Head Teacher said "thanks from myself and my students for all your wonderful organising for a great day. It certainly showed "our maths teachers" that we need to do more hands-on activities and practise at problem solving."

Outcomes for Parents include:

- Textbook work does not elicit the excited responses that the activities of the Maths Challenge do
- Real world problems required knowledge in several areas of Mathematics.

Feedback about making grants available for such projects:

Without this grant, the Mathematics Challenge Days in the Riverina would not be possible. Many of the schools are quite distant from any town, and so the opportunity for these students to engage in Mathematical Activities with other students is gladly awaited, and taken.

Mathematics Challenge Days for Students in Years 7 and 8 Numeracy Week 2009

Rationale: To celebrate National Literacy and Numeracy Week by

- providing students with a variety of Mathematical Activities which are both fun and challenging.
- providing an opportunity for interaction with students who attend other schools and who have an interest and talent in the area of Mathematics.

Time: 9:00 am until 3:30 pm. There will be a short recess and a lunch break. Students and supervisors will need to supply their own food and beverages, but the canteens at the venues will be available. To assist the canteen ladies, we will need to put in orders at the start of the day

Schools are invited to enter one or two teams of students from years 7 and 8. Each team consists of 4 students **and an adult supervisor**. One of these adult supervisors **must be a teacher**, but the second supervisor may be a parent who is prepared to be involved all day. If necessary, a responsible student from Year 9 or Year 10 could be the second supervisor

Program

Time	Activity
9:00 am	Arrive at the school and make way to hall for registration of team
9:15 am	Welcome to all schools Acknowledgement of Country
9:30 am – 10:20 am	Group Contest Teacher and Adult Supervisors' Meeting
10:25 am – 11:25 am	Swiss Contest
11:25 am – 11:45 am	Recess
11:45 am – 12:35 pm	Activity Contest**
12:35 pm – 1:20 pm	Lunch
1:20 pm – 2:20 pm	Relay Contest
2:30 pm – 3:00 pm	Tally of Scores
3:00 pm – 3:30 pm	Pack Up and Farewell

** Could each team please supply an empty A4 paper box, or one a similar size.

Students need to bring pens, rulers, pencils, and scrap paper. A calculator is not necessary.



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Mathematics
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Descriptions of Activities

Activity	Students	Supervisors
Group Contest	Completing Puzzles as a team	Briefing on roles during other activities.
Swiss Contest	Completing contest (pairs of teams at a station)	2 per station 1 recording student answers, the other scoring
Puzzle Corner	Five activities completed in Tabloid fashion	Supervising a given station (team).
Relay Contest	2 pairs per team, solving questions	Each team has 1 supervisor allocated
Tally of Scores, Presentation of Certificates	Remain in the hall for the presentation.	Supervision of whole group
Pack Up and Farewell	All students assist in packing up chairs, tables etc	Assisting in packing up and organising students

1) Group Contest.

Students work in their team of 4 at a table and try to solve the problems as a team. Students may use calculators, pen and paper.

2) Swiss Contest

It is completing a table of values, however, the students are to find the rule, given three pairs of values only, then solve the rest of the values. For example, if the following table was shown,

x	3	5	-2	7	10	-8	0.5	-1.5
y	4	6	-1					

the students would need to work out that the pattern is $y = x + 1$ and then add one to each of the x values to get the appropriate y value.

- Two teams compete against each other and try to solve the answers alternatively.
- Students stand in an arc, with students from each team alternating.
- There are two supervisors at each station and they remain there as the schools move on. One of the supervisors marks down on a score sheet the school that answers each question correctly and then totals the scores at the end. The other supervisor fills in the large display sheet (which is on the floor in front of the teams) with the correct answer when it given.
- There are usually five rounds, with schools competing against 5 different teams in the different rounds.

3) Puzzle Corner

- Students work as a team to complete 5 different puzzles set up as stations. Students move to a table, wait until the buzzer goes. 7 minutes is allowed for each activity. A buzzer will sound the end of the activity.
- The supervisor checks the solutions and tallies the scores for each team.
- Students return the equipment to the way it was when they arrived at the table.
- Teams rotate to the next activity when instructed by the supervisor.

4) Relay Contest

Students work in pairs with the first pairing answering the odd questions and the second pairing answering the even questions. There are 20 questions in total.

Rules:

- (a) The students are only allowed 3 attempts at any one question and then the question is forfeited. They may forfeit the question at any time. A forfeited question scores zero straight away.
- (b) Any question forfeited cannot be retried at any stage. Not even if they finish the relay contest early.
- (c) A pair can only go on to their next question if it is the next one on top. For example, If the odd team answer questions 1 and 3 and are up to question 5, but the even team is still on question 2 then the odd team must wait until the even team either gets the question correct, exhaust their 3 attempts, or forfeit the question. This means the even team can move to Question 4 and the odd team can start on Question 5.

Supervisors sit at a table and wait for the students to run out and hand up their solutions to each question. If it is correct enter the marks on the sheet, if it is incorrect then tell them it is incorrect, and let them decide whether to retry, or forfeit. Supervisors total the team's marks at the end.



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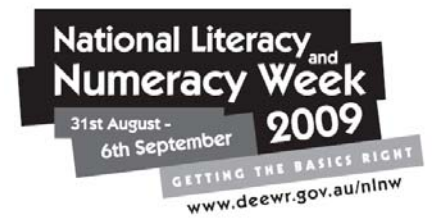
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2009 Riverina Mathematics Challenge



Team Name
School

Group Contest

- Answer each question on the question sheets.
- Attempt all questions.
- You may use calculators, pens and scrap paper.
- Return sheets in number order and paper clip on top left hand corner.
- Only seek assistance from your team members.

Question 1

1, 2, 3, 4, 5, 6, 7, 8, 9, 10 uses 11 digits.

a) How many digits does the list 1, 2, 3, 4, 18, 19, 20 take?

b) A book has used 1140 digits to number the pages. How many pages in the book?

Question 2

Mrs Mallowan was making toast in her high-level grill for a tea party for senior citizens. The grill holds two big slices of wholemeal bread, which is toasts one side at a time. Mrs Mallowan found it takes 1 minute to toast one side to perfection. This means she can toast two slices on both sides in 2 minutes. How can she toast both sides of three slices of bread in 3 minutes?

Question 3

Diophantus passes one sixth of his life as a child, one twelfth as a youth, and one seventh more as a bachelor. Five years after his marriage, a son was born. This son died four years before his father at half his father's eventual age. To what age did Diophantus live?



Question 4

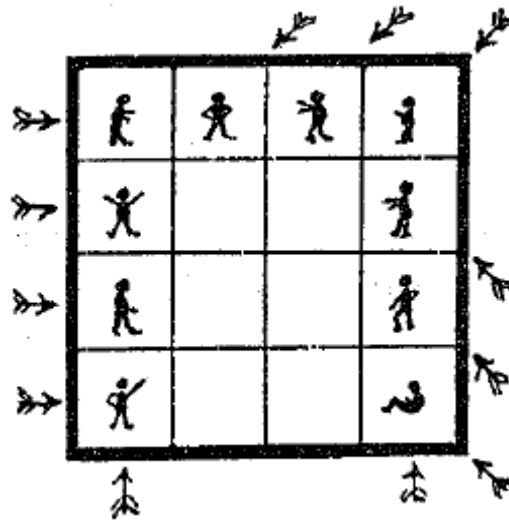
The following diagram shows a square arrangement of 16 prison cells. There are prisoners in 10 of the cells.

The prison warden wants to rearrange the prisoners so that there will be as many even rows of men as possible vertically, horizontally and diagonally). That is, rows holding 2 or 4 prisoners.

In our present diagram, there are 12 such rows indicated by the arrows. The greatest number of such rows possible is 16.

The warden will only allow **four** prisoners to be moved to different cells. Also, the prisoner in the bottom right hand cell is never to be moved. Can you follow these rules and produce 16 even rows?

Draw a diagram of your solution which shows where you put the prisoners, and the movement of the four prisoners.



Circle the diagram with your final answer.

Question 5

Complete the following Crossnumber

1	2	
3		4
5		

Across Clues

- 1 A factor of 3 across
- 3 An odd number with each digit greater than the previous one.
- 5 The product of 1 Down and an even number

Down Clues

- 1 See 5 across
- 2 Seen this one somewhere before?
- 4 A perfect square.

Question 6

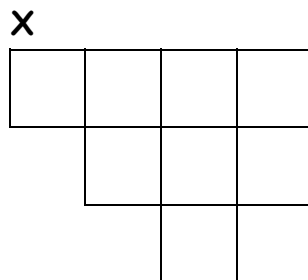
This year at 12 hours and 34 minutes and 56 seconds on the 7 of August the time and date was 12:34:56 07/08/09.

This will never happen in your teachers' lives again, but it is possible to happen in your lifetime.

When will this be?

Question 7

Here is an unusual mould for toffee which produces 8 squares. Can you cut the toffee into two equal pieces with one straight knife-cut which goes through the corner marked X?



Question 8

The boss was so pleased with the work of his 100 employees during the month that he announced that he would subsidise the lunches for one day, which would cost the business a total of \$1000. He said "Each senior employee will receive \$30, each intermediate employee will receive \$20, and each junior will have \$5. There are five times as many intermediates as there are seniors. How many juniors are there in the firm?"

Question 9

It is possible to have a triangle whose angle sizes are three square numbers. Find the size of each of the angles.

Question 10

Can you trace a path through this honeycomb of numbers counting from 1 to 57 in numerical order?

