### Project title:
Numeracy Day

### Project description:
A selection of cross curricula activities are being developed to promote numeracy skills based upon best practice in numeracy teaching.

The activities are aimed at fostering behaviours that enable students to make sense of numerical information in their world.

One year group (Year 8) will participate in the activities, guided by a teacher who will provide structured reading, writing, talking and listening opportunities.

Students will be rewarded during the day with a numeracy morning tea and with the provision of some materials used in fun activities.

A short film documentary of the day is to be constructed by the student Cineliteracy group.

### Person responsible for project:
Marilyn Maxwell

### School, region, diocese:
Gulgong High School
Western Region

### Contact person’s email:
marilyn.r.maxwell@education.nsw.gov.au

### Number of students, teachers, parents, other community members directly involved:
- 51

### Intended literacy and/or numeracy outcomes:
- development of numeracy skills for students in identified areas of: number, data, measurement and space and geometry
- promotion of strategies in numeracy problem solving
- encouragement in students of a positive attitude and confidence with numeracy
- raise teacher awareness of the importance of students developing effective numeracy skills across all KLAS
- stronger links with the parent body and community through participation in learning activities.

### Evidence of achievement of intended literacy and/or numeracy outcomes:
- Students completed the attached activities, covering a variety of numeracy skills.
- Staff asked relevant questions to encourage some students when solving group problems and in the outside activities.
- Staff observations:
  - Students displayed great enthusiasm when involved in the team relay and group problem solving.
  - Students were noticed supporting each other in using strategies to solve each problem.
  - Students who often experience difficulty with learning were observed to be involved and confidently offering suggestions.
  - Communication between students was focused on the problem with much discussion taking place.
  - Student’s enjoyment of the day was obvious to all staff present.
  - Staff made numerous positive comments during the day regarding student engagement.
Groups persisted to find a solution to the 8 Queens problem. Usually one student took the initiative to lead but participation of all members of the group was evident. All groups were able to find at least one solution.

Unexpected results for some students in the bubble activity encouraged them to consider other ideas which they discussed with peers and staff.

Novel solutions to some questions in the numeracy trail were provided.

E.g. Estimate the circumference of this tree. Describe how you decided on this answer. ‘165.5 cm. Alana is 163 cm, she hugged the tree and we calculated the space between.’

- Comments from students included:
  ‘I enjoyed the bubble activity because it involved science and maths and was fun.’
  ‘The relay was good because we all helped get the answers.’
  ‘I liked the 8 Queens problem because it made you think.’
  ‘I liked the 8 Queens problem because it’s like chess and we worked together.’
- Anecdotal evidence from some staff of improved attitude and interest of students in class following the numeracy day.
- Staff from several KLAs were involved in the day.
- One member of staff who took part in the numeracy day activities, successfully used the format of the team relay for revision of a topic in her class.
- Proposal for similar days has been suggested. Broaden the KLA involvement and increase the participation of parents.

Feedback about making grants available for such projects:
Provision of the grant allowed the school to focus on this activity during Literacy and Numeracy Week. It helped with motivation and commitment of staff in a busy school schedule. The employment of a casual teacher which allowed extra assistance on the day was valuable. Funding to allow time for the development of further activities would be beneficial.

Materials:

**Numeracy Trail**

1. Look at your map of the school. Go to Portable 7. Time how long it takes to walk to K1 if you hurry. .................................................................

   Time how long it takes to walk to K1 if you dawdle........................................

   What is the difference in time? .............................................................................

   Would this be significant in making a student late for class? .............................

2. Go to Q2. What 2 D shapes can you see on the ground in this area? ..................

   ................................................................................................................................

3. Estimate how many of litres of water the tank outside room C2 will hold. How did you work out your answer? ..........................................................

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   ..................................................................................................................................
4. a) Face the Ag plot gate. Make a one half turn. Estimate the height of the tree you are now facing. Describe how you decided on this answer. 
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……………………………………………………………………………………………………

b) Estimate the circumference of this tree. Describe how you decided on this answer.
……………………………………………………………………………………………………
……………………………………………………………………………………………………

5. Estimate how many bricks are covered by the box on the wall at U4.5 .................

6. Where can you find this pattern? Describe it using geometrical terms.

7. Find a number greater than 1000, printed on an object OUTSIDE a class room. Write the number and name the location.

8. Estimate the distance from the steps of K4 to the canteen. .........................

9. When you walk from the canteen to K4, in which direction are you walking? ............

10. Draw a bird’s eye view of the gym.

11. This is a picture of the ramp outside room J2.
    Estimate the angle the ramp makes with the horizontal.
    ………………………………….  


12. Where can you see this object? Name the solids which make it.

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………………………………………………
………………………………………………

13. Write a numeracy question for next year’s trail.

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GHS Excursion Note

Purpose: Numeracy Day
Where: Gulgong High School
Date: 3rd September 2008

Dear Parents/Carers

Students will be released from normal classes on Wednesday 3rd September 2008 to attend an activity day developed to enhance the numeracy skills of students across different subject areas. Parents who would like to participate in the activities on this day are invited to contact Mrs Maxwell through the school office and register their interest in being a part of this experience.

This day has been arranged to coincide with National Literacy & Numeracy Week and Gulgong High has been successful in obtaining a grant from the Australian Government to support this project. During the day students may be photographed and videoed. To allow the school to include such photographs and videos in the report for the NLNW website, please complete the attached Consent Agreement for your student. Please return it to the front office by 1st September.

Morning tea will be provided for the students at recess.

Cost: NIL

Dress requirements: Full School Uniform

Students need to bring: Pens, pencils.

Teachers attending: Mrs Maxwell, Mrs Swaisland, Mr Osborn, Ms Holland

Return of Consent Forms to the Front Office by 1/9/08

Signature of Organising Teacher                              Signature of Principal

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Detach along dotted line

GULGONG HIGH SCHOOL
EXCURSION – PARENTAL PERMISSION

I hereby consent to my son / daughter / ward ________________________ of Year 8 participating in the educational activities approved by the Principal on Wednesday 3/9/08.

I understand that student behaviour on such occasions should be exemplary and that any breaches will be brought to the immediate attention of the Principal.

_________________________________________  Date ___/___/____
Parent’s signature
Eight Queens Problem

Reference: The Mathematics Curriculum and Teaching Program.
Activity Bank
by Charles Lovitt and Doug Clarke
Curriculum Corporation 1992

Do Ahead: mark out an 8×8 grid in the playground

Instructions to students:
We are going outside to a giant chessboard- an 8×8 grid which has been drawn in the playground. The problem is for 8 of you to stand on the grid so that no two students are on the same horizontal, vertical or diagonal line. Only one student is permitted to stand in a square. When you have a solution, copy it onto your sheet and hand it to the teacher. The time you have taken will be recorded. There will be a small prize for any group that succeeds and the fastest team on the day will receive a further prize.

Notes for teacher in charge:
A good group should be able to solve this in about 20 minutes.
If a group finishes, ask them to find a different solution. (Not a reflection or rotation)
Students may like to know that there are 12 different possible solutions.

With about 5 minutes to go, ask students to write down the strategies they were using to solve the problem.
**Eight Queens Problem**

*Instructions to students:*
We are going outside to a giant chessboard- an 8×8 grid which has been drawn in the playground. The problem is for 8 of you to stand on the grid so that no two students are on the same horizontal, vertical or diagonal line. Only one student is permitted to stand in a square. When you have a solution, copy it onto this sheet and hand it to the teacher. The time you have taken will be recorded. There will be a small prize for any group that succeeds and the fastest team on the day will receive a further prize.

**SOLUTION 1**

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**SOLUTION 2**

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**Strategies used:**
**Bubbles**

**Bubble shapes**

Make some bubbles using the ring provided. What shape are your bubbles?..............................

Can you blow bubbles of other solids? Bend a pipe cleaner into another shape. e.g. triangle, square, star. Blow a bubble through your new shape. 
Describe the shape of this bubble. .................................................................

**Double bubbles**

Make some bubbles with the ring. 
Catch 2 bubbles of different sizes together. 
Describe what happens where the two bubbles join..............................................

...............................................................................................................................

Catch 2 bubbles that are the same size. 
Describe what happens where the two bubbles join..............................................

...............................................................................................................................

Experiment by catching 3 bubbles, 4 bubbles, etc and describe what happens.

**Bubbles and tiles**

Moisten a tile. Catch a bubble on the tile. 
Draw a picture of what happens to the bubble.

Place another tile gently on top of the bubble 
Draw a picture of what happens to the bubble.
**Cubic bubbles**

Collect a cubic frame from the teacher.  
Dip the frame in the bubble mix.  
Draw the result from two different views.  
What shapes are formed?

Without bursting these bubbles, dip the frame halfway into the bubble mix.  
Where is the cubic bubble?

**Other bubbles**

Collect other frames from the teacher and experiment. Describe what you find.

**Description Activity**

Come to the front to view the picture.

Your task is to describe the following picture to your partner.

You must stand with your hands behind your back.

Your partner is not permitted to speak to you.

Your partner must draw this picture using your instructions.
Group problems

Problems have been taken from
Get it together
Equals
Lawrence Hall of Science
Berkeley, California. 1989

Instructions for students.

Each group will be given an envelope. When told to start, open the envelope and pass a clue card to each member of the group. When you get your clue, you may only look at your own clue. You may not look at anyone else’s. You may share your clue by telling others what’s on it. You must not show it to anyone else.

When you think you have a solution raise your hand and a teacher will check it for you. If you are correct you will be given the next problem.
Meg’s Number

The sum of the digits of Meg’s number is greater than ten.

Help your group find Meg’s number on the Hundred Chart!

Meg’s Number

The difference between the two digits of Meg’s number is greater than three.

Help your group find Meg’s number on the Hundred Chart!

Meg’s Number

Meg’s number is a multiple of seven.

Help your group find Meg’s number on the Hundred Chart!

Meg’s Number

The first digit of Meg’s number is larger than the second.

Help your group find Meg’s number on the Hundred Chart!

Meg’s Number

Meg’s number is not odd.

Help your group find Meg’s number on the Hundred Chart!

Meg’s Number

Both digits of Meg’s number are even.

Help your group find Meg’s number on the Hundred Chart!
Stick Figures 1

There are twelve sticks in the figure. The sticks are unbroken and they don't overlap.

Make the figure!

Stick Figures 1

There are eight sticks in the square.

Make the figure!

Stick Figures 1

There are four sticks in the interior of the square.

All of the sticks are the same length.

Make the figure!

Stick Figures 1

There are six sticks in the triangle.

Make the figure!

Stick Figures 1

The triangle and the square share a side.

Make the figure!

Stick Figures 1

In the figure, both the rectangle and the triangle are regular polygons.

Make the figure!
Terry’s Triangle

The red and green pieces form two identical small triangles that are parts of Terry’s triangle.

Use Pattern Blocks to help your group make Terry’s triangle!

Terry’s Triangle

The green piece that’s right at the top of Terry’s triangle doesn’t touch the other green piece.

Use Pattern Blocks to help your group make Terry’s triangle!

Terry’s Triangle

There are twice as many blue pieces as green ones, and half as many reds as blues.

Use Pattern Blocks to help your group make Terry’s triangle!

Terry’s Triangle

There is a red piece right in the middle on the bottom of Terry’s triangle.

Use Pattern Blocks to help your group make Terry’s triangle!

Terry’s Triangle

There are a total of eight red, green, and blue pieces in Terry’s triangle.

Use Pattern Blocks to help your group make Terry’s triangle!

Terry’s Triangle

Each blue piece touches another blue piece.

Use Pattern Blocks to help your group make Terry’s triangle!
Three Kids With Fruit

Andi has lots of apples (more than a dozen, but less than a hundred) but no oranges and no pears. In fact, she has half the total number of fruit.

Brent and Claudia are there too; between them they have more pears than oranges.

How many of which fruits does each kid have?

Three Kids With Fruit

If Claudia had twice as many pears, she would have one more pear than Brent. And you know what? She's the only kid with oranges. Neither Andi nor Brent have any oranges at all.

How many of which fruits does each kid have?

Don't forget you can use manipulatives to help your group solve the problem.

Three Kids With Fruit

Andi has half the total number of fruit (apples plus oranges plus pears) that all the kids have. And she has no pears.

If Claudia shared her oranges equally with Andi, they would each wind up with two oranges.

How many of which fruits does each kid have?

Three Kids With Fruit

Brent has no oranges and Andi has all the apples. Still, Brent and Claudia have the same total number of fruit, when you add up their apples, oranges, and pears.

How many of which fruits does each kid have?

Three Kids With Fruit

If Andi shared her apples equally with her friends Claudia and Brent and herself, there would be none left over.

Claudia has some pears. In fact, if she had twice as many as she has now, she would have one more pear than Brent.

How many of which fruits does each kid have?

Claudia and Brent have the same total number of fruit (apples plus oranges plus pears).

And if they put just their pears together, they could not divide them equally — three ways — among themselves and Andi.

How many of which fruits does each kid have?