

# Reach For The Stars

Each year since 2003, the Australian Association of Mathematics Teachers has been conducting Reach for the Stars as part of National Literacy and Numeracy Week.

The aim of the program is to give students the opportunity to take part in a real-life mathematics activity. Students will collect data and submit their results to a national data collection via the Internet. They will explore both their own data and the data collected by participants from across Australia.

Each year a different experiment is chosen with a host of activities planned across the year levels from Prep through to Year 12. In 2008, students will be collaborating in a nationwide coin-throwing experiment. They will investigate whether the results are influenced by various factors including the arrangement of the target, the distance of the thrower, and the characteristics of the coin being thrown. Students will also design some experiments of their own.

Depending upon their age, students will engage with the mathematics of the experiment at an appropriate level &ndash; from considering which target is easier to hit and why, through to comparing calculated theoretical probabilities; all using the experimental findings from hundreds of schools. The activities have involved more than 50 000 students each year. In 2007, data was reported by 76 862 participants in 506 schools.

In 2008, one of those schools will be Jindalee, with several teachers choosing to take part to extend their students' mathematical understanding.

Regular updates to our activities will be provided and we will showcase what our students are doing.

## Prep P

Prep P voted to use a fifty cent coin. They were assisted by a buddy class to collect their results.

## Year 1

Year One threw a 10c coin over throwing distances of fifty and one hundred centimetres. They predicted and trialled which coin was most likely to land on the bullseye. Students used stacked Venn Diagrams to represent and compare their results.

## Year 2

Year Two students enjoyed discussing how to conduct a fair experiment. They plotted their individual results on small targets to make it easier to compare distances and target accuracy.

Students are eager to continue the experiment by posing and investigating questions to which they are keen to find an answer. Suggestions so far include:

Is it better to sit, stand or kneel when releasing the coin?

Are Year Two students more accurate coin tossers than Prep students?

Year 3

Year Three students predicted the closer the throwing distance the greater the chance of scoring a bullseye. To test their prediction they suggested collecting data for distances of fifty, one hundred and two hundred centimetres. To make their data easier to interpret and compare, they constructed circle graphs.

Year 4

Year 4A/F were challenged to work in groups to pose a question to investigate and predict a solution for this question.

Groups selected a pathway to use to test their predictions by making decisions on

- which variables to change or keep the same
- which data collection method to use
- the size of the sample
- a way to organise the collected data to justify their findings.

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- Group 1 correctly predicted 50 centimetres was the best distance from which to throw to score a bullseye.
- Group 2 predicted most coins would land on the target but found most coins actually landed off the target.
- Group 3 were interested in finding out which area of the target a twenty coin would be most likely to land on.

- Group 4 improved their original question by making it more ambiguous. Which is the best coin to use to score a bullseye?
- Group 5 adapted their experiment by adding more throwing distances.
- Group 6 realised they would need many trials to provide them with enough data to confidently answer their question.

Year 5

Year 5W began the coin tossing experiment by trying to calculate the area of each target space.

We then made predictions about what would happen when we tossed a 20c coin onto the target from 200cm. We quickly discovered that our predictions were a long way off! So, in a back to front approach, rather than changing their predictions, they tried changing variables in order to find ways in which they could reach their predictions. Shorting the distance thrown from turned out to be very important.

The class then decided it would be fun to design a version of the game to play at the school fete. However, as the whole point of the fete is to make money, it was necessary to make sure that the cost of prizes won did not exceed the entry price. Groups of students worked together to create their own game; deciding on the rules (distances thrown, coin types etc) for their game and then waiting for the national data to be made available. Using the raw data, and removing any data not needed, they worked out a probable ratio of coins landing in each target area under their chosen conditions. They are currently using that information to calculate a budget, work out the number of prizes that would need to be purchased and cost their game entry to ensure a profit.

Carpet - 20 cent

A

B

C

D

E

Total

Total

3792

6783

6158

5432

22001

44166

Percent

8.59

15.36

13.94

12.30

49.81

100.00

Updates will be provided as their progress continues&hellip;..

#### Year 6 & 7

Year 6/7 chose to collect data on what they considered to be the most challenging combination of variables &ndash; a throwing distance of 200 centimetres, a five cent coin and a concrete surface. The results proved this was indeed a challenging combination as only two students in the whole class managed to land their coin on the target. Students are keen to continue investigating which combination of variables will allow most students in the class to land on the target.