

TRIAL MATERIAL WORK IN PROGRESS

Differentiated plans for Years 5 & 6 for Chance & Data

Ian Lowe, MAV Professional Officer, 2007

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ilowe@mav.vic.edu.au

**THIS WILL QUALIFY YOU
FOR AN IMPROVED VERSION
WHEN AVAILABLE**

Materials are recommendations only; suitable substitutions may be made.

MAV materials may be bought from www.mav.vic.edu.au/shop

Download the Curriculum Corporation catalogue from
http://www.curriculum.edu.au/catalogue/downloads/pc2007_pages39-54.pdf

and look at pages 48 and 49.

For Learning Federation materials (Learning Objects),
check out 'Digital Learning Resources' on your laptop, or download them from the new education
website www.education.vic.gov.au/studentlearning/teachingresources/elearning/digilearn.htm.

Differentiated plans for Years 5 & 6 Chance & Data

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Chance and Data is linked to Measurement only for reporting; it is a separate strand of content. A rich learning environment is needed that can help children to understand and to achieve at their own level. This topic can only be given 2 weeks per semester in Years 5 and 6.

This set of units – one per semester for Years 5 & 6 – could achieve this goal. It matches the specifications for VELs, but recognises that there will be a wide spread of achievement in each class. So children are differentiated into working groups by need, for some of the time only. There may be more than one group at any Standard, or some Standards may need to be combined. Plan a stimulating set of activities for homework review, such as Interactive Learning spreadsheets.

It also balances the *toolbox* requirements – concepts and skills – with the need to learn to apply those tools in *problem solving* situations. Hence there are whole class lessons (often from Maths300 or RIME) punctuating the toolbox development, at regular intervals. These are on the same topic, but do not attempt to mesh with the work done by each ‘standard’ group. They ensure that *Working Mathematically* is always part of the learning process, integrated into each dimension.

The mix of activities will provide a stimulating and rich learning environment, with students learning from and helping one another. Connections between topics will be made and reinforced, and the variety of learning styles will accommodate learners with different needs.

How does it work?

In Years 5 and 6 it is assumed that children will be working anywhere from Standard 3 to Standard 5. Probably most will be working on Standards 3 or 4.

At regular intervals whole class lessons are taught to ‘mixed ability’ groups.

Between these are cycles of a fixed pattern of lessons. In Years 5 and 6, the cycle has three parts: teaching, worksheet or games, computer use.

On any day all are taking place in the same classroom, so only a fraction of the resources are needed. But the cycle also works for the students: they follow the pattern – teaching, worksheet, (problem solving) and computer. As a consequence, teaching is to a different group each day in a regular pattern. Teaching will be for a concentrated 20 minutes or so, and then the teacher will supervise the rest of the class. Instructions on the board will inform the other groups of what they are to do. Encourage students to help each other.

What resources are needed?

Access to 4 or 5 computers daily is expected. Computer pods or laptop trolleys might be the best solution. Membership of Maths300 is a requirement; many schools have membership – here is how to use it.

The pages in the resources are listed for each day’s lesson, but are summarised here. Sources are: MAV (Mathematical Association of Victoria), CC (Curriculum Corporation), LF (Learning Federation).

- *Teaching*: Maths Continuum (DE&T), People count (MAV), Dice don’t have brains (MAV), Working mathematically–Investigations (CC), Chance & Data Investigations 1 and 2 (CC)
- *Worksheets & games*: Active Learning 1 (M,C&D), Active Learning 2 (M,C&D) (all from MAV),
- *Computer*: Interactive Learning (MAV), Learning Objects (LF)
- *Problem solving*: Problem Solving Task Centre (CC), Maths300 (CC), RIME (MAV), RIME 5&6 (MAV)

How could it be adapted to different situations?

If your class does not have the range predicted, or you cannot manage three or four groups, you should adapt by ignoring columns. You may substitute other learning tasks at any time. If you run out of time, leave stuff out. In this rich environment you will be surprised how much is learned outside the ‘planned’ activities.

How do I assess the learning?

At the end of the tables are sets of questions based on *understanding* at each VELs standard that will allow you to place children into groups and monitor progress at selected times. However your observations, digital photographs and copies of children’s work will be more useful than any external ‘test’.

Year 5 Semester 1 Data

Day	Year 5 sem 1: towards Std 3	Towards Std 4 group	Towards Std 5 group
1	Chance & Data Investigations 2: Performance data (1 of 2)		
2	<p align="center">Teach gathering of frequency data for different data types</p> <p align="center">People count #70 Statistics – using data for a purpose, #71 Collecting data</p> <p align="center">Active Learning 2 (M,C&D) D1 Short data activities</p>	<p align="center">Problem Solving Task Centre</p> <p align="center">1 Final Eight, 47 Red/Black Card Game, 49 Take A Chance, 128 Highest Number 2, 162 Game Show, 197 Chocolate Chip Cookies, 223 Cat and Mouse, 224 Matching Faces</p>	<p align="center">Computer</p> <p align="center">Interactive Learning National areas, AFL ladders, Australian weather, Olympic track & field, AFL 1992, Education, Melb/Vic/Aust, English Proficiency, Age pyramid, AFL heights, Netball heights, Birthplaces & languages, Income – Victoria, Marital status, Heights of teenagers, DIY database</p> <p align="center">Learning objects Foul Foodmaker, Healthy life survey, Home internet survey, Leisure survey, Rice crisp machine, Matchbox machine</p>
3	<p align="center">Computer</p> <p align="center">Learning objects Spinners, Mystery spinner, Vile vendor</p> <p align="center">http://nlvm.usu.edu/en/nav/vlibrary.html</p> <p align="center">Spinners, Histogram, Boxplot, Bar chart, Histogram, Pie chart</p>	<p align="center">Teach using questionnaires to obtain discrete and continuous data</p> <p align="center">People count #70 Statistics – using data for a purpose, #71 Collecting data</p> <p align="center">Active Learning 2 (M,C&D) D8 Your own statistical investigation, D9 Opinion survey</p>	<p align="center">Problem Solving Task Centre</p> <p align="center">6 Counter Escape, 13 The Frog Pond, 20 Pack The Box, 46 Duelling Dice, 76 Tube Toss, 99 How Many Beans? 117 Twelve Counters, 133 Win At The Fair, 87 Triangle Area, 191 Choosing Beads, 197 Chocolate Chip Cookies, 223 Cat and Mouse, 224 Matching Faces, 226 Playing With Objects</p>
4	<p align="center">Problem Solving Task Centre</p> <p align="center">6 Counter Escape, 13 The Frog Pond, 18 Same Or Different, 20 Pack The Box, 34 Dice Differences, 46 Duelling Dice, 53 Have A Hexagon, 58 See-Saw, 76 Tube Toss, 87 First Down The Mountain, 117 Twelve Counters, 131 Walk The Plank, 133 Win At The Fair, 191 Choosing Beads, 198 What's In the Bag? 200 Greedy Pig</p>	<p align="center">Computer</p> <p align="center">Interactive Learning Families – Victoria,</p> <p align="center">Learning objects Rice crisp machine, Matchbox machine, Healthy life survey, Home internet survey, Leisure survey</p> <p align="center">standards.nctm.org/document/eexamples/index.htm</p> <p align="center">5.4 Accessing and Investigating Data Using the World Wide Web</p>	<p align="center">Teach using technology to organise data tables and displays (dot plots, stem and leaf plots, column graphs, bar charts and histograms)</p> <p align="center">People count #70 Statistics – using data for a purpose, #71 Collecting data, #72 Describing data – tables</p> <p align="center">Active Learning 2 (M,C&D) D10 Male and female incomes, D13 Using tables of data</p>
5	Chance & Data Investigations 2: Performance data (2 of 2)		
6	<p align="center">Teach display of frequency data for different data types</p> <p align="center">People count #74 Describing data – graphs</p> <p align="center">Continuum 3 Choosing Appropriate Graphical Displays</p> <p align="center">Active Learning 2 (M,C&D) D5 The media – statistically responsible?</p>	<p align="center">Problem Solving Task Centre</p> <p align="center">See Std 4 day 2</p>	<p align="center">Computer</p> <p align="center">Interactive Learning Boxplot, Histogram, Stemplot unordered, Estimating means, Mean vs median, Mean and quartiles, IQR & SD,</p> <p align="center">Learning objects Foul Foodmaker, Healthy life survey, Home internet survey, Leisure survey, Rice crisp machine, Matchbox machine</p> <p align="center">http://nlvm.usu.edu/en/nav/</p>

Day	Year 5 sem 1: towards Std 3	Towards Std 4 group	Towards Std 5 group
			vlibrary.html Histogram http://illuminations.nctm.org/Activities.aspx Histogram tool, Bar grapher, Box plotter
7	<p>Computer</p> <p>Interactive Learning Median, Stemplot unordered, Lineplot, Boxplot</p> <p>Learning objects Spinners, Mystery spinner, Vile vendor</p> <p>http://nlvm.usu.edu/en/nav/vlibrary.html Boxplot,</p>	<p>Teach presenting data in appropriate summary statistics and displays</p> <p>People count #73 Describing data – summary statistics, #74 Describing data – graphs</p> <p>Continuum 4 A critical approach to summary statistics and graphs</p> <p>Active Learning 2 (M,C&D) D5 The media – statistically responsible? D11 Investigating wealth</p>	<p>Problem Solving Task Centre</p> <p>See Std 5 day 3</p>
8	<p>Problem Solving Task Centre</p> <p>See Std 3 day 4</p>	<p>Computer</p> <p>Interactive Learning Median, Stemplot unordered, Lineplot Families – Victoria, Olympic track & field</p> <p>Learning objects Rice crisp machine, Matchbox machine, Healthy life survey, Home internet survey, Leisure survey</p> <p>http://illuminations.nctm.org/Activities.aspx Circle grapher, Bar grapher</p> <p>http://nlvm.usu.edu/en/nav/vlibrary.html Bar chart, Pie chart,</p>	<p>Teach calculating and interpreting summary statistics (mean, median, mode, range, difference)</p> <p>People count #73 Describing data – summary statistics</p> <p>Continuum 4 A critical approach to summary statistics and graphs</p>
9,10	<p>Chance & Data Investigations 2: Bikes, Monkey bars & skeletons</p>		

Year 5 Semester 2 Chance

Day	Year 5 sem 2: towards Std 3	Std 4 group(s)	Std 5 group(s)
1	Maths300 #121 Beetle Game (1 of 2)		
2	<p>Teach intuitive chance language to compare events</p> <p>People count #64 Chance by intuition</p> <p>Continuum 3 Fairness relates to having an equal chance of winning</p> <p>Active Learning 2 (M,C&D) Quickmaths C&D A-E</p>	<p>Problem Solving Task Centre</p> <p>1 Final Eight, 47 Red/Black Card Game, 49 Take A Chance, 128 Highest Number 2, 162 Game Show, 197 Chocolate Chip Cookies, 223 Cat and Mouse, 224 Matching Faces</p>	<p>Computer</p> <p>Interactive Learning Probability Long term coin tosses</p> <p>Learning objects Foul Foodmaker, Rice crisp machine, Matchbox machine,</p>
3	<p>Computer</p> <p>Interactive Learning Die racing, Coin tossing, Coin tosses, Dice rolling</p> <p>Learning objects The Slushy Sludger, Spinners</p>	<p>Teach representing estimations of chance as fractions, decimals or percentages</p> <p>People count #64 Chance by intuition</p> <p>Active Learning 2 (M,C&D) Quickmaths C&D E</p>	<p>Problem Solving Task Centre</p> <p>6 Counter Escape, 13 The Frog Pond, 20 Pack The Box, 46 Duelling Dice, 76 Tube Toss, 99 How Many Beans? 117 Twelve Counters, 133 Win At The Fair, 87 Triangle Area, 191 Choosing Beads, 197 Chocolate Chip Cookies, 223 Cat and Mouse, 224 Matching Faces, 226 Playing With Objects</p>
4	<p>Problem Solving Task Centre</p> <p>6 Counter Escape, 13 The Frog Pond, 18 Same Or Different, 20 Pack The Box, 34 Dice Differences, 46 Duelling Dice, 53 Have A Hexagon, 58 See-Saw, 76 Tube Toss, 87 First Down The Mountain, 117 Twelve Counters, 131 Walk The Plank, 133 Win At The Fair, 191 Choosing Beads, 198 What's In the Bag? 200 Greedy Pig</p>	<p>Computer</p> <p>Interactive Learning Lotto, Coin tossing, Coin tosses, Dice rolling, Marbles, Raffle, Spinner, Dice football, Dice totals</p> <p>Learning objects The Slushy Sludger, Spinners, Mystery spinner, The vile vendor, The foul food maker, Dice duels</p> <p>http://illuminations.nctm.org/Activities.aspx Adjustable spinner</p> <p>http://nlvm.usu.edu/en/nav/vlibrary.html Spinners</p>	<p>Teach probability as long-run relative frequency</p> <p>People count #66 Probability – chance by prediction</p> <p>Continuum 5 Short run variation and long-run stability</p>
5	Maths300 #121 Beetle Game (1 of 2)		
6	<p>Teach planning of chance experiments, inc. collecting and displaying data</p> <p>People count #65 Simulation – chance by experiment</p> <p>Continuum 3 Choosing Appropriate Graphical Displays</p>	<p>Problem Solving Task Centre</p> <p align="center">See Std 4 day 2</p>	<p>Computer</p> <p>Interactive Learning Coin tossing, Several coins, Die rolling, Getting, Marbles, Raffle, Spinner, Peg bag</p> <p>Learning objects Foul Foodmaker, Rice crisp machine, Matchbox machine</p> <p>http://illuminations.nctm.org/Activities.aspx Adjustable spinner</p>
7	<p>Computer</p> <p>Interactive Learning</p>	<p>Teach simulation of chance events using random</p>	<p>Problem Solving Task Centre</p> <p align="center">See Std 5 day 3</p>

Day	Year 5 sem 2: towards Std 3	Std 4 group(s)	Std 5 group(s)
	Die racing, Coin tossing, Coin tosses, Dice rolling Learning objects Spinners, Mystery spinner, Vile vendor http://illuminations.nctm.org/Activities.aspx Adjustable spinner	devices People count #65 Simulation – chance by experiment	
8	Problem Solving Task Centre See Std 3 day 4	Computer See Std 4 day 4	Teach calculating simple probabilities of equally likely events People count #66 Probability – chance by prediction Active Learning 2 (M,C&D) Quickmaths C&D A, B
9	Maths300 #121 Beetle Game (2 of 2)		
10	Maths300 #6 Have A Hexagon		

Year 6 Semester 1 Data

Day	Year 6 sem 1: towards Std 3	Towards Std 4 group	Towards Std 5 group
1	Chance & Data Investigations 2: Chairs & tables - just right (1 of 2)		
2	Teach designing questions for data collecting People count # 71 Collecting data Active Learning 2 (M,C&D) Quickmaths C&D I-M, D8 Your own statistical investigation	Problem Solving Task Centre 1 Final Eight, 47 Red/Black Card Game, 49 Take A Chance, 128 Highest Number 2, 162 Game Show, 197 Chocolate Chip Cookies, 223 Cat and Mouse, 224 Matching Faces	Computer Interactive Learning Boxplot, Histogram, Stemplot unordered, Estimating means, Mean vs median, Mean and quartiles Learning objects Foul Foodmaker, Healthy life survey, Home internet survey, Leisure survey, Rice crisp machine, Matchbox machine http://illuminations.nctm.org/Activities.aspx Circle grapher, Bar grapher http://nlvm.usu.edu/en/nav/vlibrary.html Bar chart, Histogram, Pie chart standards.nctm.org/document/eexamples/index.htm 5.4 Accessing and Investigating Data Using the World Wide Web
3	Computer Interactive Learning Families – Victoria Learning objects Vile vendor	Teach using grouping of data and histograms People count #73 Describing data – summary statistics,	Problem Solving Task Centre 6 Counter Escape, 13 The Frog Pond, 20 Pack The Box, 46 Duelling Dice, 76 Tube Toss, 99 How Many Beans? 117 Twelve Counters, 133 Win At The Fair, 87 Triangle

Day	Year 6 sem 1: towards Std 3	Towards Std 4 group	Towards Std 5 group
	standards.nctm.org/document/examples/index.htm 5.4 Accessing and Investigating Data Using the World Wide Web	#74 Describing data – graphs Active Learning 2 (M,C&D) Quickmaths C&D Q-T	Area, 191 Choosing Beads, 197 Chocolate Chip Cookies, 223 Cat and Mouse, 224 Matching Faces, 226 Playing With Objects
4	Problem Solving Task Centre 6 Counter Escape, 13 The Frog Pond, 18 Same Or Different, 20 Pack The Box, 34 Dice Differences, 46 Duelling Dice, 53 Have A Hexagon, 58 See-Saw, 76 Tube Toss, 87 First Down The Mountain, 117 Twelve Counters, 131 Walk The Plank, 133 Win At The Fair, 191 Choosing Beads, 198 What's In the Bag? 200 Greedy Pig	Computer Interactive Learning AFL heights, Netball heights, Birthplaces & languages, Income – Victoria, Marital status, Heights of teenagers Learning objects Healthy life survey, Home internet survey, Leisure survey http://nlvm.usu.edu/en/nav/vlibrary.html Histogram	Teach using technology to organise data tables and displays (dot plots, stem and leaf plots, column graphs, bar charts and histograms) People count #73 Describing data – summary statistics, #74 Describing data – graphs Active Learning 2 (M,C&D) Quickmaths C&D I-T
5	Chance & Data Investigations 2: Chairs & tables - just right (2 of 2)		
6	Teach collecting, displaying and interpreting data People count #70 Statistics – using data for a purpose Continuum 3 Choosing Appropriate Graphical Displays Active Learning 2 (M,C&D) Quickmaths C&D I-X, D8 Your own statistical investigation	Problem Solving Task Centre See Std 4 day 2	Computer Interactive Learning National areas, AFL ladders, Australian weather, Olympic track & field, AFL 1992, Education, Melb/Vic/Aust, English Proficiency, Age pyramid, AFL heights, Netball heights, Birthplaces & languages, Income – Victoria, Marital status, Heights of teenagers Learning objects Healthy life survey, Home internet survey, Leisure survey standards.nctm.org/document/examples/index.htm 5.4 Accessing and Investigating Data Using the World Wide Web
7	Computer See Std 3 day 3	Teach interpreting summary statistics and displays to answer questions People count #73 Describing data – summary statistics, #74 Describing data – graphs Active Learning 2 (M,C&D) Quickmaths C&D U-Y	Problem Solving Task Centre See Std 5 day 3
8	Problem Solving Task Centre See Std 3 day 4	Computer Interactive Learning Families – Victoria, Olympic track & field standards.nctm.org/document/examples/index.htm 5.4 Accessing and Investigating	Teach calculating and interpreting summary statistics (mean, median, mode, range, difference) People count #73 Describing data – summary statistics

Day	Year 6 sem 1: towards Std 3	Towards Std 4 group	Towards Std 5 group
		Data Using the World Wide Web	Active Learning 2 (M,C&D) Quickmaths C&D U-Y, D9 Opinion survey
9,10	Chance & Data Investigations 2: Popcorn		

Year 6 Semester 2 Chance

Day	Year 6 sem 2: towards Std 3	Towards Std 4 group	Towards Std 5 group(s)
1	RIME: Measurement, Space, C&D #29 Danger fractions		
2	Teach comparing chances People count #64 Chance by intuition, #65 Simulation – chance by experiment Continuum 3 Fairness relates to having an equal chance of winning Active Learning 2 (M,C&D) C1 Short chance activities	Problem Solving Task Centre 1 Final Eight, 47 Red/Black Card Game, 49 Take A Chance, 128 Highest Number 2, 162 Game Show, 197 Chocolate Chip Cookies, 223 Cat and Mouse, 224 Matching Faces	Computer Interactive Learning Dice football, One-day cricket, Tennis, Tennis set, Table tennis, Beetle, Pinball, Poker machine, Odds, Lotto, TAB, Winning streaks, Coin in the square, Learning objects Random or not, Mystery spinner, Dice duel, Rice crisp machine, Matchbox machine, http://illuminations.nctm.org/Activities.aspx Fire
3	Computer Interactive Learning Guess the chance, Marbles, Raffle, Spinner,	Teach that variable chance experiments get closer to true probabilities ‘in the long run’ People count #66 Probability – chance by prediction Continuum 5 Short run variation and long-run stability	Problem Solving Task Centre 6 Counter Escape, 13 The Frog Pond, 20 Pack The Box, 46 Duelling Dice, 76 Tube Toss, 99 How Many Beans? 117 Twelve Counters, 133 Win At The Fair, 87 Triangle Area, 191 Choosing Beads, 197 Chocolate Chip Cookies, 223 Cat and Mouse, 224 Matching Faces, 226 Playing With Objects
4	Problem Solving Task Centre 6 Counter Escape, 13 The Frog Pond, 18 Same Or Different, 20 Pack The Box, 34 Dice Differences, 46 Duelling Dice, 53 Have A Hexagon, 58 See-Saw, 76 Tube Toss, 87 First Down The Mountain, 117 Twelve Counters, 131 Walk The Plank, 133 Win At The Fair, 191 Choosing Beads, 198 What's In the Bag? 200 Greedy Pig	Computer Interactive Learning Probability, Drawing pin Learning objects Random or not, Mystery spinner, Dice duel	Teach generating random numbers for simulations using technology People count #66 Probability – chance by prediction Active Learning 2 (M,C&D) C9 Poker machine simulation, C5 Simulating AIDS, C10 Simulating card games, C11 Sports simulations
5	Chance & Data Investigations 1: Odds: fair and unfair (1 of 3)		
6	Teach recognition of equally likely events People count #64 Chance by intuition Continuum	Problem Solving Task Centre See Std 4 day 2	Computer See Std 5 day 2

Day	Year 6 sem 2: towards Std 3	Towards Std 4 group	Towards Std 5 group(s)
	<p>3 Fairness relates to having an equal chance of winning</p> <p>Active Learning 2 (M,C&D) Quickmaths A-D, C1 Short chance activities</p>		
7	<p>Computer</p> <p>Interactive Learning Die racing, Coin tossing, Coin tosses, Dice rolling</p> <p>Learning objects Spinners, Mystery spinner, The vile vendor, The foul food maker, Dice duel</p> <p>http://nlvm.usu.edu/en/nav/vlibrary.html Spinners</p> <p>http://illuminations.nctm.org/Activities.aspx Adjustable spinner</p>	<p>Teach calculating equally likely probabilities by listing all the possible outcomes of an event</p> <p>People count #66 Probability – chance by prediction</p> <p>Active Learning 2 (M,C&D) C1 Short data activities</p>	<p>Problem Solving Task Centre See Std 5 day 3</p>
8	<p>Problem Solving Task Centre See Std 3 day 4</p>	<p>Computer</p> <p>Interactive Learning Coin tossing, Coin tosses, Dice rolling, Marbles, Raffle, Spinner, Dice football, Dice totals</p> <p>Learning objects Random or not, Mystery spinner, Dice duels</p>	<p>Teach using tree diagrams to predict probabilities for two-event experiments</p> <p>People count #68 Multiplication law and tree diagrams</p>
9	Chance & Data Investigations 1: Odds: fair and unfair (2 of 3)		
10	Chance & Data Investigations 1: Odds: fair and unfair (3 of 3)		