

TRIAL MATERIAL WORK IN PROGRESS

Differentiated plans for Years 3 & 4 for Chance & Data

Ian Lowe, MAV Professional Officer, 2008

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PLEASE PROVIDE FEEDBACK TO IAN AT**

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**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 3 & 4 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 3 and 4.

This set of units – one per semester for Years 3 & 4 – 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 (from Maths300) 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 3 and 4 it is assumed that children will be working from Standard 2 to Standard 4. Probably most will be working on Standard 3. Data comes in semester 1, and Chance in semester 2 to match the Royal Show and the Melbourne Cup.

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

Between these are cycles of a fixed pattern of lessons. In Years 3 and 4, 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), Chance & Data Investigations 1 and 2 (CC)
- *Worksheets & games:*
Dice don't have brains (MAV), Tuning in with task cards (lower, middle, upper primary) (MAV)
- *Computer:*
Interactive Learning (MAV), Learning Objects (LF)
- *Problem solving:*
Problem Solving Task Centre (CC), Maths300 (MAV or CC), 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?

Your observations, digital photographs and copies of children's work will be more useful than any external 'test'.

Year 3 Semester 1 Data

Day	Yr 3 sem 1: towards Std 2	Towards Std 3	Towards Std 4
1	Chance & Data Investigations 2: People graphs (1 of 2)		
2	Teach Collecting data using questions, and making tables and column graphs People count #70 Statistics – using data for a purpose Continuum 1.75 Pictographs & bar graphs	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 Families – Victoria, Learning objects Rice crisp machine, Matchbox machine, Healthy life survey, Home internet survey, Leisure survey <u>standards.nctm.org/document/eexamples/index.htm</u> 5.4 Accessing and Investigating Data Using the World Wide Web
3	Computer Interactive Learning Column graph Learning objects Vile vendor <u>http://nlvm.usu.edu/en/nav/vlibrary.html</u> Bar chart	Teach gathering of frequency data for different data types People count #70 Statistics – using data for a purpose, #71 Collecting data Active Learning 2 (M,C&D) D1 Short data 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
4	Problem Solving Task Centre 12 counters, Choosing beads, Counter escape, Dice differences, Duelling dice, First down the mountain, Greedy pig, Have a hexagon, Same or different, The frog pond, Tube toss, Walk, the plank, What's in the bag? Win at the fair Tuning in with task cards – lower primary (see contents p6–11)	Computer Learning objects Spinners, Mystery spinner, Vile vendor <u>http://nlvm.usu.edu/en/nav/vlibrary.html</u> Spinners, Histogram, Boxplot, Bar chart, Histogram, Pie chart	Teach using questionnaires to obtain discrete and continuous data People count #70 Statistics – using data for a purpose, #71 Collecting data Active Learning 2 (M,C&D) D8 Your own statistical investigation, D9 Opinion survey
5	Chance & Data Investigations 2: People graphs (2 of 2)		
6	Teach Collecting data using questions, and making tables and column graphs or pictographs People count #71 Collecting data Continuum 1.75 Pictographs & bar graphs	Problem Solving Task Centre See Std 3 day 2	Computer Interactive Learning Median, Stemplot unordered, Lineplot Families – Victoria, Olympic track & field Learning objects Rice crisp machine, Matchbox machine, Healthy life survey, Home internet survey, Leisure survey <u>http://illuminations.nctm.org/Activities.aspx</u> Circle grapher, Bar grapher <u>http://nlvm.usu.edu/en/nav/vlibrary.html</u> Bar chart, Pie chart,

Day	Yr 3 sem 1: towards Std 2	Towards Std 3	Towards Std 4
7	<p>Computer</p> <p>Interactive Learning Column graph</p> <p>Learning objects Vile vendor</p> <p>http://nlvm.usu.edu/en/nav/vlibrary.html Bar chart</p>	<p>Teach display of frequency data for different data types</p> <p>People count #74 Describing data – graphs</p> <p>Continuum 3 Choosing Appropriate Graphical Displays</p> <p>Active Learning 2 (M,C&D) D5 The media – statistically responsible?</p>	<p>Problem Solving Task Centre</p> <p>See Std 4 day 3</p>
8	<p>Problem Solving Task Centre</p> <p>See Std 2 day 4</p> <p>Tuning in with task cards – lower primary (see contents p6–11)</p>	<p>Computer</p> <p>Interactive Learning Column graph, 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>
9,10	Chance & Data Investigations 2: Soup kitchen		

Year 3 Semester 2 Chance

Day	Yr 3 sem 2: towards Std 2	Towards Std 3	Towards Std 4
1	Maths300 #5 Greedy Pig (1 of 2)		
2	<p>Teach</p> <p>Experiments leading to awareness of equally likely outcomes</p> <p>People count #64 Chance by intuition</p> <p>Continuum 1.25 First experiences with chance</p>	<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>
3	<p>Computer</p> <p>Interactive Learning Dice football, Die racing, Peg-bag,</p>	<p>Teach intuitive chance language to compare events</p>	<p>Problem Solving Task Centre</p>

Day	Yr 3 sem 2: towards Std 2	Towards Std 3	Towards Std 4
	<p>Six punters @ TAB</p> <p>Learning objects The Slushy Sludger, Spinners, Mystery spinner, The vile vendor, The foul food maker, Dice duels, Random or not</p> <p>http://nlvm.usu.edu/en/nav/vlibrary.html Spinners</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>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>
4	<p>Problem Solving Task Centre</p> <p>See Std 3 semester 1 day 4</p> <p>Tuning in with task cards – lower primary (see contents p6–11)</p>	<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>
5	Maths300 #5 Greedy Pig (2 of 2)		
6	<p>Teach</p> <p>Chance experiments leading to tables and graphs (bar or column)</p> <p>People count #64 Chance by intuition</p> <p>Continuum 1.25 First experiences with chance</p>	<p>Problem Solving Task Centre</p> <p>See Std 3 day 2</p>	<p>Computer</p> <p>See Std 4 day 4</p>
7	<p>Computer</p> <p>Interactive Learning Dice football, Die racing, Peg-bag, Six punters @ TAB</p> <p>Learning objects The Slushy Sludger, Spinners, Mystery spinner, The vile vendor, The foul food maker, Dice duels, Random or not</p> <p>http://nlvm.usu.edu/en/nav/vlibrary.html Spinners</p>	<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>See Std 4 day 3</p>
8	<p>Problem Solving Task Centre</p> <p>See Std 2 day 4</p> <p>Tuning in with task cards – lower primary (see contents p6–11)</p>	<p>Computer</p> <p>Interactive Learning Die racing, Coin tossing, Coin tosses, Dice rolling</p> <p>Learning objects Spinners, Mystery spinner, Vile vendor</p> <p>http://illuminations.nctm.org/Activities.aspx Adjustable spinner</p>	<p>Teach simulation of chance events using random devices</p> <p>People count #65 Simulation – chance by experiment</p>
9,10	Maths300 #89 Red & Black Card Game		

Year 4 Semester 1 Data

Day	Yr 4 sem 1: towards Std 2	Towards Std 3	Towards Std 4
1	Chance & Data Investigations 2: Database debut (1 of 4)		
2	<p style="text-align: center;">Teach how to design questions, collect and graph data</p> <p style="text-align: center;">People count #71 Collecting data, #74 Describing data - graphs</p> <p style="text-align: center;">Continuum 1.75 Pictographs & bar graphs</p>	<p style="text-align: center;">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 style="text-align: center;">Computer</p> <p style="text-align: center;">Interactive Learning AFL heights, Netball heights, Birthplaces & languages, Income – Victoria, Marital status, Heights of teenagers</p> <p style="text-align: center;">Learning objects Healthy life survey, Home internet survey, Leisure survey</p> <p style="text-align: center;">http://nlvm.usu.edu/en/nav/vlibrary.html Histogram</p>
3	<p style="text-align: center;">Computer</p> <p style="text-align: center;">Interactive Learning Column graph</p> <p style="text-align: center;">Learning objects Vile vendor</p>	<p style="text-align: center;">Teach designing questions for data collecting</p> <p style="text-align: center;">People count # 71 Collecting data</p> <p style="text-align: center;">Active Learning 2 (M,C&D) Quickmaths C&D I-M, D8 Your own statistical investigation</p>	<p style="text-align: center;">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>
4	<p style="text-align: center;">Problem Solving Task Centre</p> <p>12 counters, Choosing beads, Counter escape, Dice differences, Duelling dice, First down the mountain, Greedy pig, Have a hexagon, Same or different, The frog pond, Tube toss, Walk, the plank, What's in the bag? Win at the fair</p> <p style="text-align: center;">Tuning in with task cards – lower primary (see contents p6–11)</p>	<p style="text-align: center;">Computer</p> <p style="text-align: center;">Interactive Learning Families – Victoria</p> <p style="text-align: center;">Learning objects Vile vendor</p> <p style="text-align: center;">standards.nctm.org/document/eeexamples/index.htm</p> <p>5.4 Accessing and Investigating Data Using the World Wide Web</p>	<p style="text-align: center;">Teach using grouping of data and histograms</p> <p style="text-align: center;">People count #73 Describing data – summary statistics, #74 Describing data – graphs</p> <p style="text-align: center;">Active Learning 2 (M,C&D) Quickmaths C&D Q-T</p>
5	Chance & Data Investigations 2: Database debut (2 of 4)		
6	<p style="text-align: center;">Teach how to design questions, collect and graph data</p> <p style="text-align: center;">People count #71 Collecting data, #74 Describing data - graphs</p> <p style="text-align: center;">Continuum 1.75 Pictographs & bar graphs</p>	<p style="text-align: center;">Problem Solving Task Centre</p> <p style="text-align: center;">See Std 3 day 2</p>	<p style="text-align: center;">Computer</p> <p style="text-align: center;">Interactive Learning Families – Victoria, Olympic track & field</p> <p style="text-align: center;">standards.nctm.org/document/eeexamples/index.htm 5.4 Accessing and Investigating Data Using the World Wide Web</p>
7	<p style="text-align: center;">Computer</p> <p style="text-align: center;">Interactive Learning Column graph</p> <p style="text-align: center;">Learning objects</p>	<p style="text-align: center;">Teach collecting, displaying and interpreting data</p> <p style="text-align: center;">People count #70 Statistics – using data for a purpose</p>	<p style="text-align: center;">Problem Solving Task Centre</p> <p style="text-align: center;">See Std 4 day 3</p>

Day	Yr 4 sem 1: towards Std 2	Towards Std 3	Towards Std 4
	Vile vendor	Continuum 3 Choosing Appropriate Graphical Displays Active Learning 2 (M,C&D) Quickmaths C&D I-X, D8 Your own statistical investigation	
8	Problem Solving Task Centre See Std 2 day 4 Tuning in with task cards – lower primary (see contents p6–11)	Computer See Std 3 day 4	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
9,10	Chance & Data Investigations 2: Database debut (3 and 4 of 4)		

Year 4 Semester 2 Chance

Day	Yr 4 sem 2: towards Std 3	Towards Std 3	Towards Std 4
1	RIME 5&6 Everybody wins		
2	Teach Compare likelihood of chance events using language People count #64 Chance by intuition Continuum 1.25 First experiences with chance	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
3	Computer Interactive Learning Dice football, Die racing, Peg-bag, Six punters @ TAB Learning objects The Slushy Sludger, Spinners, Mystery spinner, The vile vendor, The foul food maker, Dice duels, Random or not http://nlvm.usu.edu/en/nav/vlibrary.html Spinners	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
4	Problem Solving Task	Computer	Teach that variable chance

Day	Yr 4 sem 2: towards Std 3	Towards Std 3	Towards Std 4
	<p align="center">Centre</p> <p>12 counters, Choosing beads, Counter escape, Dice differences, Duelling dice, First down the mountain, Greedy pig, Have a hexagon, Same or different, The frog pond, Tube toss, Walk, the plank, What's in the bag? Win at the fair</p> <p>Tuning in with task cards – lower primary (see contents p6–11)</p>	<p>Interactive Learning Guess the chance, Marbles, Raffle, Spinner,</p>	<p>experiments get closer to true probabilities ‘in the long run’</p> <p>People count #66 Probability – chance by prediction</p> <p>Continuum 5 Short run variation and long-run stability</p>
5	Dice don't have brains: Ladybird		
6	<p align="center">Teach</p> <p align="center">Compare likelihood of chance events using language</p> <p>People count #64 Chance by intuition</p> <p>Continuum 1.25 First experiences with chance</p>	<p align="center">Problem Solving Task Centre</p> <p align="center">See Std 3 day 2</p>	<p align="center">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>
7	<p align="center">Computer</p> <p>Interactive Learning Dice football, Die racing, Peg-bag, Six punters @ TAB</p> <p>Learning objects The Slushy Sludger, Spinners, Mystery spinner, The vile vendor, The foul food maker, Dice duels, Random or not</p> <p>http://nlvm.usu.edu/en/nav/vlibrary.html Spinners</p>	<p align="center">Teach recognition of equally likely 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 A-D, C1 Short chance activities</p>	<p align="center">Problem Solving Task Centre</p> <p align="center">See Std 4 day 3</p>
8	<p align="center">Problem Solving Task Centre</p> <p align="center">See Std 2 day 4</p> <p>Tuning in with task cards – lower primary (see contents p6–11)</p>	<p align="center">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 align="center">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>
9	Dice don't have brains: Animal pick		
10	Dice don't have brains: Rolling records		