

# TRIAL MATERIAL WORK IN PROGRESS

**Differentiated plans for Years 7 & 8**

## **Measurement**

**Ian Lowe, MAV Professional Officer, 2006**

**IF YOU USE ANY OF THIS  
PLEASE PROVIDE FEEDBACK TO IAN AT**

**[ilowe@mav.vic.edu.au](mailto: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](http://www.mav.vic.edu.au/shop)**

**Download the Curriculum Corporation catalogue from**

**[http://www.curriculum.edu.au/catalogue/downloads/pc2007\\_pages39-54.pdf](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](http://www.education.vic.gov.au/studentlearning/teachingresources/elearning/digilearn.htm).**

# Differentiated plans for Years 7 & 8

## Measurement

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### What do we have here?

Measurement ideas are very practical ways of employing the more abstract ideas of number, such as place value. So extra effort is required to create a rich learning environment that can help children to understand and to achieve at their own level. This needs to be achieved in just two weeks, at each level.

This set of units – one per semester for Years 7 & 8 – 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 7 and 8 the spread will be from Standard 4 and 5. 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 two parts: teaching and worksheet or games. In Years 7 and 8, the cycle has four parts: teaching, worksheet or games, problem solving (choice from a set of tasks) and computer use (a variety).

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*: Guidelines in Measurement (MAV), Maths Continuum (DE&T), People count (MAV)
- *Worksheets*: Active Learning 1: Measurement, C&D, Active Learning 2: Measurement, C&D (both MAV),
- *Computer*: Interactive Learning (MAV), Learning Objects (LF)
- *Problem solving*: Problem Solving Task Centre (CC), RIME (MAV), Maths300 (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?

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 7 Semester 1 Measurement**

<b>Day</b>	<b>Yr 7 sem 1 'Towards Std 3'</b>	<b>'Towards Std 4' group(s)</b>	<b>'Towards Std 5' group(s)</b>
<b>1</b>	<b>Maths300 #45 Circumference of a Circle or RIME M14 How far is it round a circle?</b>		
<b>2</b>	<b>Problem Solving Task Centre</b> 26 Travelling Australia 41 Scale Drawing, 63 Fried Rice, 85 Time Swing 126 Planets, 156 Photo Angles, 204 Decimals With A Tape, 207 Triangle Perimeters	<b>Teach length: metric units (m, cm, mm)</b> <b>Guidelines in Measurement</b> p40-54 <b>People count #31 Length</b> <b>Active Learning 1 (M,C&amp;D)</b> M2 Indoor measurement activities, OR M3 Outdoor measurement activities	<b>Computer</b> <b>Interactive Learning</b> Conversions, Rectangle, Circumference, Bike distances and speed, Rectangle area, Metric conversions, Perimeter of polygon <b>Learning objects</b> Area of triangles, Area of compound shapes, Inside cubes
<b>3</b>	<b>Teach length: formal units (cm)</b> <b>Guidelines in Measurement</b> p40-54 <b>People count #31 Length</b> <b>Active Learning 2 (M,C&amp;D)</b> Quickmaths Meas A-D <b>Active Learning 1 (M,C&amp;D)</b> M1 Estimating distances	<b>Computer</b> <b>Interactive Learning</b> Conversions, Rectangle, Circumference, Bike distances and speed, Rectangle area, Metric conversions, Perimeter of polygon <b>Learning objects</b> Journey planner	<b>Problem Solving Task Centre</b> 99 How Many Beans? 114 Where Is The Rectangle? 138 A Rectangle Of Squares, 193 Surface Area With Tricube, 224 Matching Faces, 226 Playing With Objects 187 Triangle Area, 207 Triangle Perimeters,
<b>4</b>	<b>Worksheet / hands-on</b> <b>Active Learning 1 (M,C&amp;D)</b> M2 Indoor measurement activities	<b>Problem Solving Task Centre</b> 26 Travelling Australia 63 Fried Rice, 204 Decimals With A Tape, 207 Triangle Perimeters 41 Scale Drawing, 85 Time Swing, 126 Planets, 156 Photo Angles, 158 Brick Walls, 217 Kids On Grids, 227 Volume Line Up	<b>Teach</b> <b>Perimeters of polygons</b> <b>Continuum 4.0</b> Perimeter and area are not the same <b>People count #32 Perimeter</b> <b>Active Learning 1 (M,C&amp;D)</b> M43 Furniture and curtains
<b>5</b>	<b>RIME M15 Round and round or M16 Bicycle chain</b>		
<b>6</b>	<b>Problem Solving Task Centre</b> See Std 3 lesson 2 <b>Computer</b> <b>Learning objects</b> Journey planner	<b>Teach area (cm<sup>2</sup>, m<sup>2</sup>)</b> <b>Guidelines in Measurement</b> p70-75 <b>People count #34 Area</b> <b>Active Learning 2 (M,C&amp;D)</b> Quickmaths Meas V-AA <b>Active Learning 1 (M,C&amp;D)</b> M21 Estimating metric lengths and areas	<b>Computer</b> See Std 5 lesson 3
<b>7</b>	<b>Teach length: metric units (m, cm, mm)</b> <b>Guidelines in Measurement</b> p40-54 <b>People count #31 Length</b> <b>Active Learning 1 (M,C&amp;D)</b> M2 Indoor measurement activities, OR M3 Outdoor measurement activities	<b>Computer</b> See Std 4 lesson 3 and also <b>Interactive Learning</b> W,H,A&P, Some areas, Quad areas,	<b>Problem Solving Task Centre</b> See Std 5 lesson 3

Day	Yr 7 sem 1 'Towards Std 3'	'Towards Std 4' group(s)	'Towards Std 5' group(s)
8	<b>Worksheet / hands-on</b> <b>Active Learning 1 (M,C&amp;D)</b> M24 Tangram areas	<b>Problem Solving Task Centre</b> See Std 4 lesson 4	<b>Teach</b> <b>Circumference of circle</b> <b>Guidelines in Measurement</b> p96 <b>People count</b> #33 Circumference <b>Active Learning 1 (M,C&amp;D)</b> M27 The relationship $c = \pi d$

### Year 7 Semester 2 Measurement

Day	Yr 7 sem 2 'Towards Std 3'	'Towards Std 4' group(s)	'Towards Std 5' group(s)
1	<b>Maths300 #44 Area of a Triangle or #165 Surface Area With Tricubes</b>		
2	<b>Problem Solving Task Centre</b> 26 Travelling Australia 41 Scale Drawing, 63 Fried Rice, 85 Time Swing 126 Planets, 156 Photo Angles, 204 Decimals With A Tape, 207 Triangle Perimeters	<b>Teach volume (cm<sup>3</sup>, m<sup>3</sup>) and capacity (L and mL)</b> <b>Guidelines in Measurement</b> p122-133 <b>People count</b> #37 Volume, capacity and cuboids <b>Active Learning 1 (M,C&amp;D)</b> M19 Making a litre, M35 Volume by displacement <b>Active Learning 2 (M,C&amp;D)</b> M12 Getting familiar with capacity	<b>Computer</b> See Std 5 lesson 2 and also <b>Interactive Learning</b> W,H,A&P <b>Learning objects</b> Area of triangles, Area of compound shapes, Inside cubes
3	<b>Teach</b> <b>Area – informal units, cm<sup>2</sup></b> <b>Guidelines in Measurement</b> 63-69 <b>People count</b> #34 Area <b>Active Learning 2 (M,C&amp;D)</b> Quickmaths Meas V-AA <b>Active Learning 1 (M,C&amp;D)</b> M5 Centimetre grid, AND M6 Pentomino area problems	<b>Computer</b> <b>Interactive Learning</b> W,H,A&P, Some areas, Quad areas, Area of polygon, Cuboids, Box volumes, Boxes <b>Learning objects</b> Area of triangles, Area of compound shapes, Inside cubes	<b>Problem Solving Task Centre</b> 99 How Many Beans? 114 Where Is The Rectangle? 138 A Rectangle Of Squares, 193 Surface Area With Tricube, 224 Matching Faces, 226 Playing With Objects, 187 Triangle Area, 207 Triangle Perimeters,
4	<b>Worksheet / hands-on</b> <b>Active Learning 1 (M,C&amp;D)</b> M22 Estimating irregular areas	<b>Problem Solving Task Centre</b> 26 Travelling Australia 63 Fried Rice, 204 Decimals With A Tape, 207 Triangle Perimeters 41 Scale Drawing, 85 Time Swing, 126 Planets, 156 Photo Angles, 158 Brick Walls, 217 Kids On Grids, 227 Volume Line Up	<b>Teach areas of triangles and quadrilaterals</b> <b>People count</b> #35 Area: triangles and parallelograms <b>Active Learning 1 (M,C&amp;D)</b> M26 Pick's rule OR M32 Outdoor parallelograms
5	<b>Maths300 #43 Area of a Circle (Calcs) or RIME M17 Pizza value</b>		
6	<b>Problem Solving Task Centre</b> See Std 3 lesson 2	<b>Teach</b> <b>Mass (Kg, g, T)</b> <b>Guidelines in Measurement</b> p220-230 <b>People count</b> #40 Mass and density	<b>Computer</b> See Std 5 lesson 2 and also <b>Interactive Learning</b> Some areas, Quad areas, Circle and square, Circle area, Value of $\pi$ , Area of polygon

Day	Yr 7 sem 2 'Towards Std 3'	'Towards Std 4' group(s)	'Towards Std 5' group(s)
		<b>Active Learning 2 (M,C&amp;D)</b> M10 Measuring mass	<b>Learning objects</b> Area of triangles, Area of compound shapes, Inside cubes
7	<b>Teach time: h, min, sec, clocks</b> <b>Guidelines in Measurement</b> p196 Continuum 4.0 Time intervals <b>People count #42</b> Time: short durations <b>Computer</b> <b>Interactive Learning</b> Clock <b>Active Learning 2 (M,C&amp;D)</b> Quickmaths Meas M-T	<b>Computer</b> See Std 4 lesson 3	<b>Problem Solving Task Centre</b> See Std 5 lesson 3
8	<b>Worksheet / hands-on</b> <b>Active Learning 1 (M,C&amp;D)</b> M12 Walking and running OR M13 Bike or car speeds, OR CD9 Reaction times	<b>Problem Solving Task Centre</b> See Std 4 lesson 4	<b>Teach areas of circles</b> <b>Continuum 4.75</b> Area of a circle <b>People count #36</b> Area: circles <b>Active Learning 1 (M,C&amp;D)</b> M30 Count the circle areas

### Year 8 Semester 1 Measurement

Day	Yr 8 sem 1: Towards Std 3	'Towards Std 4' group(s)	'Towards Std 5' group(s)
1	<b>Maths300 #80 Cylinder Volumes or RIME 5/6 p13 Wally with water</b>		
2	<b>Problem Solving Task Centre</b> 26 Travelling Australia 41 Scale Drawing, 63 Fried Rice, 85 Time Swing 126 Planets, 156 Photo Angles, 204 Decimals With A Tape, 207 Triangle Perimeters	<b>Teach</b> <b>Time: calendars, timelines</b> <b>Guidelines in Measurement</b> p186-200 <b>Continuum 4.0</b> Time intervals <b>People count #41</b> Time: calendar <b>Active Learning 1 (M,C&amp;D)</b> M8 Shadow clocks OR M9 Pendulum OR M39 Time and longitude <b>Active Learning 2 (M,C&amp;D)</b> M16 Time by the sun	<b>Computer</b> <b>Interactive Learning</b> Some areas, Quad areas, Circle and square, Circle area, Value of $\pi$ , Area of polygon <b>Learning objects</b> Area of triangles, Area of compound shapes, Inside cubes
3	<b>Teach capacity (litres, mL)</b> <b>Guidelines in Measurement</b> p123 <b>People count #37</b> Volume, capacity and cuboids <b>Active Learning 1 (M,C&amp;D)</b> M19 Making a litre	<b>Computer</b> <b>Interactive Learning</b> Calendar, Clock, Time calculations, Daylight, Sundial <b>Learning objects</b> Journey planner	<b>Problem Solving Task Centre</b> 99 How Many Beans? 114 Where Is The Rectangle? 138 A Rectangle Of Squares, 193 Surface Area With Tricube, 224 Matching Faces, 226 Playing With Objects, 187 Triangle Area, 207 Triangle Perimeters,
4	<b>Worksheet / hands-on</b> <b>Active Learning 1 (M,C&amp;D)</b> M35 Volume by displacement	<b>Problem Solving Task Centre</b> 26 Travelling Australia 63 Fried Rice, 204 Decimals With A Tape, 207 Triangle Perimeters 41 Scale Drawing, 85 Time Swing,	<b>Teach volume, capacity and surface area of prisms</b> <b>People count #38</b> Volume and surface area: prisms and cylinders

Day	Yr 8 sem 1: Towards Std 3	'Towards Std 4' group(s)	'Towards Std 5' group(s)
		126 Planets, 156 Photo Angles, 158 Brick Walls, 217 Kids On Grids, 227 Volume Line Up	<b>Active Learning 1 (M,C&amp;D)</b> M34 Side lengths of a box of given volume OR M36 Shapes with 1 litre capacity
<b>5</b>	<b>Maths300 #81 Biggest Volume or RIME M18 Biggest volume</b>		
<b>6</b>	<b>Problem Solving Task Centre</b> See Std 3 lesson 2	<b>Teach temperature (°C)</b> <b>Active Learning 1 (M,C&amp;D)</b> M15 Cooling coffee	<b>Computer</b> See Std 5 lesson 2
<b>7</b>	<b>Teach volume (cm<sup>3</sup>, m<sup>3</sup>)</b> <b>Guidelines in Measurement</b> p133-135 <b>People count #37</b> Volume, capacity and cuboids <b>Active Learning 1 (M,C&amp;D)</b> M45 To rain or not to rain	<b>Computer</b> See Std 4 lesson 3 <b>Active Learning 2 (M,C&amp;D)</b> M17 Temperature and time	<b>Problem Solving Task Centre</b> See Std 5 lesson 3
<b>8</b>	<b>Worksheet / hands-on</b> <b>Active Learning 1 (M,C&amp;D)</b> M37 Melbourne's water	<b>Problem Solving Task Centre</b> See Std 4 lesson 4	<b>Teach volume, capacity and surface area of cylinders</b> <b>People count #38</b> Volume and surface area: prisms and cylinders <b>Active Learning 1 (M,C&amp;D)</b> M38 Estimating small volumes

### Year 8 Semester 2 Measurement

Day	Year 8 sem 2: 'Towards Std 3' group(s)	'Towards Std 4' group(s)	'Towards Std 5' group(s)
<b>1</b>	<b>Maths300 #166 Newspaper Cubes &amp; Volume of a Room</b>		
<b>2</b>	<b>Problem Solving Task Centre</b> 26 Travelling Australia 41 Scale Drawing, 63 Fried Rice, 85 Time Swing 126 Planets, 156 Photo Angles, 204 Decimals With A Tape, 207 Triangle Perimeters	<b>Teach converting units</b> <b>(length - mm, cm, m;</b> <b>mass - g, kg; capacity - mL, L;</b> <b>time - h, min, sec)</b> <b>Continuum 4.0</b> Converting between measurement units <b>People count #31</b> Length, #37 Volume, capacity and cuboids, #42 Time: short durations <b>Active Learning 1 (M,C&amp;D)</b> M11 Perpetual calendar	<b>Computer</b> <b>Interactive Learning</b> Max volume cone, Volume of pyramid, Surface area to volume, Pyramid and cone, Truncated pyramid, Truncated cone, <b>Learning objects</b> Area of compound shapes, Inside cubes
<b>3</b>	<b>Teach mass (kg, g)</b> <b>Guidelines in Measurement</b> p220-227 <b>People count</b> #40 Mass and density <b>Active Learning 1 (M,C&amp;D)</b> M36 Shapes with 1 litre capacity,	<b>Computer</b> <b>Interactive Learning</b> Conversions, Metric conversions, Time/distance/speed, Planets, Scale/area/volume <b>Learning objects</b> Measures	<b>Problem Solving Task Centre</b> 99 How Many Beans? 114 Where Is The Rectangle? 138 A Rectangle Of Squares, 193 Surface Area With Tricube, 224 Matching Faces, 226 Playing With Objects 187 Triangle Area, 207 Triangle Perimeters,

Day	Year 8 sem 2: 'Towards Std 3' group(s)	'Towards Std 4' group(s)	'Towards Std 5' group(s)
4	<b>Worksheet / hands-on</b> <b>Active Learning 1 (M,C&amp;D)</b> M38 Estimating small volumes	<b>Problem Solving Task Centre</b> 26 Travelling Australia 63 Fried Rice, 204 Decimals With A Tape, 207 Triangle Perimeters 41 Scale Drawing, 85 Time Swing, 126 Planets, 156 Photo Angles, 158 Brick Walls, 217 Kids On Grids, 227 Volume Line Up	<b>Teach density</b> <b>People count</b> #40 Mass and density <b>Active Learning 1 (M,C&amp;D)</b> M37 Melbourne's water OR M58 Finding densities
5	<b>RIME M10 How fast do I travel? and/or M 11 Car speeds</b>		
6	<b>Problem Solving Task Centre</b> See Std 3 lesson 2	<b>Teach converting units (area - <math>\text{cm}^2</math>, <math>\text{m}^2</math>, volume - <math>\text{cm}^3</math>, <math>\text{m}^3</math>)</b> <b>Continuum</b> 5.25 Converting between derived units <b>People count</b> #34 Area, #37 Volume, capacity and cuboids <b>Active Learning 1 (M,C&amp;D)</b> M23 Rectangles: constant perimeter or area	<b>Computer</b> <b>Interactive Learning</b> Calendar, Clock, Time calculations, Daylight, Sundial, Time/distance/speed, Planets, Scale/area/volume, Boxes, Sun position, Max volume cone, Volume of pyramid, Surface area to volume, Pyramid and cone, Truncated pyramid, Truncated cone, Floating, Day of year, Earth-moon
7	<b>Teach time (calendar)</b> <b>Guidelines in Measurement</b> p186-200 <b>People count</b> #41 Time: calendar <b>Active Learning 1 (M,C&amp;D)</b> M11 Perpetual calendar	<b>Computer</b> <b>Interactive Learning</b> Conversions, Rectangle, Circumference, Bike distances and speed, Rectangle area, Time/distance/speed, Planets, Scale/area/volume, Day of year, Earth-moon	<b>Problem Solving Task Centre</b> See Std 5 lesson 3
8	<b>Worksheet / hands-on</b> <b>Active Learning 1 (M,C&amp;D)</b> M10 History of Melbourne OR M41 Using maps and timetables	<b>Problem Solving Task Centre</b> See Std 4 lesson 4	<b>Teach speed</b> <b>People count</b> #43 Speed <b>Active Learning 2 (M,C&amp;D)</b> M14 Time and speed <b>Active Learning 1 (M,C&amp;D)</b> M14 A rolling ball OR M16 Olympic speeds