

TRIAL MATERIAL WORK IN PROGRESS

Differentiated plans for Years 5 & 6 for Whole Numbers

Ian Lowe, MAV Professional Officer, 2007

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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

Whole numbers and integers

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Whole number concepts and skills are the basis of most other mathematical ideas. They are a major focus for VELS Standard 1 to 4 -- primary school for the average child. Ideas of integers are introduced and calculations with negatives begin in Standard 5. 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 topic can only be given 3 weeks in Years 5 and 6, because of the demand for time from Fractions, decimals, percentage and ratio and associated ideas.

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 2 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. 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 Number (MAV), Maths Continuum (DE&T), People count (MAV)
- *Worksheets & games*: Active Learning 1 (Number & Algebra), Active Learning 2 (N&A), Card Capers, Dice Dazzlers, Tackling tables (all MAV)
- Active Learning 2 (all 3 books) contains 'Quickmaths', very useful for homework and review
- *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 Whole numbers

Day	Yr 5 sem 1: Towards Std 3	Towards Std 4	Towards Std 5
1	Maths300 #26 Highest number		
2	Teach Place value to 1000 Guidelines in Number p53-58 People count #3	Worksheet Active Learning 1 (N&A) N2 Building the greatest Active Learning 2 (N&A) Quickmaths Sets 1-3, N1 Sum games Card Capers, Dice Dazzlers	Computer Interactive Learning Aliquot, Bob's buttons, Lockers, Mirror products, Sticky numbers, Billiard ball paths
3	Worksheet/games Active Learning 1 (N&A) N2 Building the greatest Games 1, 2 Active Learning 2 (N&A) Quickmaths Set 1 Card Capers (J) Dice Dazzlers	Computer Interactive Learning Money by 10 or 100, 10 or 100 times what? Reading a scale, Powers of 10(x), Powers of 10 (÷) Learning Objects Decimaster, Wishball	Teach Factors, common factors and HCF People count #8
4	Maths300 #35 Nine and over		
5	Computer Interactive Learning Adding to 20, Adding single digits, Subtract from 20, Skip count to 9999, Skip count to 140 Learning Objects Wishball, Decimaster	Teach Place value to a million Guidelines in Number p51-58, 147-148, 153-156 People count #9	Worksheet/games Active Learning 1 (N&A) N12 Divisibility Active Learning 2 (N&A) Quickmaths Sets 1-3, N3 Multiply & divide, N6 Dividing, N11 Mixed bag, N12 Remainders
6	Maths300 #71 Eureka		
7	Teach Multiplication and division of whole numbers by 10 People count #9 Number boards: middle primary p29	Worksheet/games Active Learning 1 (N&A) N3 Number sentences Active Learning 2 (N&A) Quickmaths Sets 4-6 Card Capers (J or M) Dice Dazzlers	Computer Interactive Learning Aliquot, Bob's buttons, Lockers, Mirror products, Sticky numbers, Billiard ball paths,
8	Worksheet/games Active Learning 1 (N&A) N2 Building the greatest Games 3, 4 Active Learning 2 (N&A) Quickmaths Set 2 Card Capers (J or M) Dice Dazzlers	Computer See Std 4 Lesson 3	Teach Prime numbers People count #8 RIME N9 or MCTP p441 Licorice factory
9	Maths300 #14 The Farmer's puzzle		
10	Computer See Std 3 Day 5	Teach Addition, inc associative and commutative	Worksheet/games Active Learning 1 (N&A) N14 Investigating primes Active Learning 2 (N&A)

Day	Yr 5 sem 1: Towards Std 3	Towards Std 4	Towards Std 5
		Guidelines in Number p63, 70, 86, 124-128 People count #5	Quickmaths Sets 4-6
11	Maths300 #96 Take away of the day		
12	Teach Add and subtract to 100 mentally Guidelines in Number p63, 70 Continuum 1.75 Fact families People count #4	Worksheet/games Active Learning 1 (N&A) N4 Number facts through card games Active Learning 2 (N&A) Quickmaths Sets 7-9, N2 Order of operations, N4 Patterns Card Capers (J or M) Dice Dazzlers	Computer See Std 5 Day 2
13	Worksheet/games Active Learning 1 (N&A) N2 Building the greatest Games 5, 6 Active Learning 2 (N&A) Quickmaths Set 3 Number grids Games p29-43	Computer See Std 4 Day 3	Teach Multiples, common multiples and LCM People count #8 Number grids Games p45-50
14	Maths300 #17 Eric the sheep		
15	Computer See Std 3 Day 5	Teach Subtraction, inc. commutative and associative laws Guidelines in Number p64-65, 129, 176 People count #5	Worksheet/games Active Learning 1 (N&A) N11 Checkmath Active Learning 2 (N&A) Quickmaths Sets 7-9, N10 Rich pattern hunting

Year 5 Semester 2 Whole numbers

Day	Yr 5 sem 2: Towards Std 3	Towards Std 4	Towards Std 5
1	Maths300 #37 Spiders and ants		
2	Teach Add and subtract, as inverse operations, and number laws Guidelines in Number p47-48 Continuum 1.5 Using a hundreds chart for mental calculation People count #4	Worksheet/games Active Learning 1 (N&A) N5 Patterns in the multiplication table Active Learning 2 (N&A) Quickmaths Sets 10-12, N7 Number puzzles Tackling tables	Computer Interactive Learning Powers of 10(x), Powers of 10 (÷), Multiply with powers of 10, Divide with powers of 10, Base 5, Base 2,
3	Worksheet/games Active Learning 1 (N&A) N4 Number facts through card	Computer Interactive Learning Subtract hundreds, Three circles puzzle, Checking change,	Teach Powers, including base number and exponent

Day	Yr 5 sem 2: Towards Std 3	Towards Std 4	Towards Std 5
	<p>games</p> <p>Active Learning 2 (N&A) Quickmaths Set 4</p> <p>Card Capers (J)</p>	<p>Long multiplication, Estimate to multiply, Single digit multiply, Estimate to multiply, Two digit multiply, Estimate multiplying, Long multiplication</p> <p>Learning Objects Divide it up, Integer cruncher, Hopper, School canteen, The divider</p>	<p>People count #3</p> <p>Motivational maths p56-63</p>
4	Maths300 #97 Tackling times tables		
5	<p>Computer</p> <p>Interactive Learning Grid patterns, Adding to 100, Doubling, Adding, Add money, Backwards adding, Addition facts, Subtraction facts, Subtract from 100, Subtract by adding, Differences, Subtract any from 100</p> <p>Learning Objects Divide it up, Integer cruncher, Hopper, School canteen, The divider, The multiplier</p>	<p>Teach</p> <p>Subtraction of hundreds, inc. 'middle zero' problem</p> <p>Guidelines in Number p64-65, 129, 176</p> <p>People count #5</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N16 Multiplying by doubling and halving</p> <p>Active Learning 2 (N&A) Quickmaths Sets 10-12, N18 Maths@work: Who uses exponents?</p>
6	Maths300 #52 Multo		
7	<p>Teach</p> <p>Single digit multiplication</p> <p>Guidelines in Number p47, 65</p> <p>Continuum 2.75 Better multiplication strategies</p> <p>People count #6</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N6 Sticky numbers</p> <p>Active Learning 2 (N&A) Quickmaths Sets 13-15</p> <p>Card Capers (J or M)</p> <p>Dice Dazzlers</p>	<p>Computer</p> <p>See Std 5 Day 2</p>
8	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N4 Number facts through card games</p> <p>Active Learning 2 (N&A) Quickmaths Set 5</p> <p>Card Capers (J or M)</p> <p>Dice Dazzlers</p>	<p>Computer</p> <p>See Std 4 Day 3</p>	<p>Teach</p> <p>Base 2 and base 2 addition</p> <p>People count #3</p> <p>RIME N13 Russian multiplication</p>
9	Maths300 #30 Truth tiles		
10	<p>Computer</p> <p>See Std 3 Day 5</p>	<p>Teach</p> <p>Multiplying by single digits and by 10</p> <p>Guidelines in Number p65</p> <p>Continuum 3.0 Fluent recall of multiplication facts</p> <p>People count #11</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N17 Games using powers of 2</p> <p>Active Learning 2 (N&A) Quickmaths Sets 13-15</p>
11	Maths300 #51 Hunting for stars		

Day	Yr 5 sem 2: Towards Std 3	Towards Std 4	Towards Std 5
12	<p>Teach</p> <p>Multiplication table facts – short cuts and laws</p> <p>Guidelines in Number p49</p> <p>Continuum 3.0 Fluent recall of multiplication facts</p> <p>People count #8</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N7 Mirror products</p> <p>Active Learning 2 (N&A) Quickmaths Sets 16-18</p> <p>Tackling tables</p>	<p>Computer</p> <p>See Std 5 Day 2</p>
13	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N4 Number facts through card games</p> <p>Active Learning 2 (N&A) Quickmaths Set 6</p> <p>Tackling tables</p>	<p>Computer</p> <p>See Std 4 Day 3</p>	<p>Teach</p> <p>Multiplication in base 2</p> <p>Easy – only 1 times and 0 times tables!</p>
14	RIME N17 Game of 31		
15	<p>Computer</p> <p>See Std 3 Day 5</p>	<p>Teach (long) multiplication by two digit numbers</p> <p>Guidelines in Number p131-133, 178</p> <p>People count #11</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N18 A human binary counter, N19 The A-series of paper sizes</p> <p>Active Learning 2 (N&A) Quickmaths Sets 16-18</p>

Year 6 Semester 1 Whole numbers and integers

Day	Yr 6 sem 1: Towards Std 3	Towards Std 4	Towards Std 5
1	Maths300 #87 Making one million OR RIME 5/6 Million		
2	<p>Teach multiplication tables</p> <p>Guidelines in Number p67, 92, 123-124, 168-172</p> <p>Continuum 3.0 Fluent recall of multiplication facts</p> <p>People count #8</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N8 Sequences</p> <p>Active Learning 2 (N&A) Quickmaths Sets 19-21</p> <p>Dice Dazzlers</p>	<p>Computer</p> <p>Interactive Learning Walk to add or subtract, Add integers</p> <p>Learning Objects Integer cruncher</p>
3	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N5 Patterns in the multiplication table</p> <p>Active Learning 2 (N&A) Quickmaths Set 7</p> <p>Tackling tables</p>	<p>Computer</p> <p>Interactive Learning Missing numbers, Multo Random, Multiple patterns, Order of operations, Biggest number, Distributive laws, Estimate to multiply, Single digit multiply, Two digit multiply, Estimate multiplying, Long multiplication</p> <p>Learning Objects The multiplier, Divide it up, Integer cruncher, Hopper, School canteen, The divider</p>	<p>Teach integers and adding positive and negative numbers</p> <p>People count #30</p> <p>Maths300 #76 Protons and Antiprotons</p>
4	Maths300 #12 Gauss beats the teacher		

Day	Yr 6 sem 1: Towards Std 3	Towards Std 4	Towards Std 5
5	<p>Computer</p> <p>Interactive Learning Groups of (small), Groups of, Tables, Multiplication facts, Multo Random,</p> <p>Learning Objects The multiplier</p>	<p>Teach</p> <p>Multiplication, distributive law and order of operations</p> <p>People count #10</p> <p>RIME N6 'Got It!'</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N22 Slide rule and nomogram for adding</p> <p>Active Learning 2 (N&A) Quickmaths Sets 19-21</p>
6	Maths300 #28 Number tiles		
7	<p>Teach multiplication, estimating and calculators</p> <p>Guidelines in Number p94, 1125, 173</p> <p>Continuum 3.25 Choosing multiplication or division</p> <p>People count #6</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N9 Remainder game</p> <p>Active Learning 2 (N&A) Quickmaths Sets 22-24</p>	<p>Computer</p> <p>See Std 5 Day 2</p>
8	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N5 Patterns in the multiplication table</p> <p>Active Learning 2 (N&A) Quickmaths Set 8</p> <p>Tackling tables</p>	<p>Computer</p> <p>See Std 4 Day 3</p>	<p>Teach adding integers People count #30</p> <p>Maths300 #76 Protons and Antiprotons</p>
9	Maths300 #29 Steps		
10	<p>Computer</p> <p>See Std 3 Day 5</p>	<p>Teach</p> <p>Two-digit numbers divided by one digit inc. by zero</p> <p>Guidelines in Number p66, 88, 134, 180</p> <p>Continuum 3.25 Choosing multiplication or division</p> <p>People count #12</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N23 Magic squares with integers</p> <p>Active Learning 2 (N&A) Quickmaths Sets 22-24</p>
11	Maths300 #62 '4 and 20 blackbirds'		
12	<p>Teach single digit multiplication and extensions</p> <p>Guidelines in Number p68, 93, 124</p> <p>People count #8</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N20 Dividing by whole numbers in your head</p> <p>Active Learning 2 (N&A) Quickmaths Sets 25-27</p>	<p>Computer</p> <p>See Std 5 Day 2</p>
13	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N13 Card games for factors</p> <p>Active Learning 2 (N&A) Quickmaths Set 9</p> <p>Card Capers (J or M), Dice Dazzlers</p>	<p>Computer</p> <p>See Std 4 Day 3</p>	<p>Teach</p> <p>Add and subtract integers</p> <p>Continuum 4.5 Subtracting negative numbers</p> <p>People count #30</p>

Day	Yr 6 sem 1: Towards Std 3	Towards Std 4	Towards Std 5
14	Maths300 #61 Doctor Dart		
15	Computer See Std 3 Day 5	Teach division of numbers to 100, with remainders Guidelines in Number p66 Continuum 3.25 Choosing multiplication or division People count #7	Worksheet/games Active Learning 1 (N&A) N24 Mystery squares Active Learning 2 (N&A) Quickmaths Sets 25-27

Year 6 Semester 2 Whole numbers and integers

Day	Yr 6 sem 2: Towards Std 3	Towards Std 4 group(s)	Towards Std 5 group(s)
1	RIME N3 Times 99 OR RIME 5/6 Times 11		
2	Teach Division facts (reverse multiplication) Guidelines in Number p26, 66 Continuum 3.25 Choosing multiplication or division People count #7	Worksheet/games Active Learning 1 (N&A) N11 Checkmath Active Learning 2 (N&A) Quickmaths Sets 28-30	Computer Interactive Learning Single digit divide, Estimate one-digit divide, Division fact rounding, Estimate to divide, Division fact rounding, Learning Objects The multiplier, The divider, School canteen, Take-away bars, Difference bars
3	Worksheet/games Active Learning 1 (N&A) N9 Remainder game Active Learning 2 (N&A) Quickmaths Set 10 Number boards: middle primary p43-45	Computer Interactive Learning Dividing up to 100, Division facts, Backwards multiplying, Spirolaterals, Common factor, Finding half, Remainders, Renaming numbers, Dividing with remainders, Single digit divide, Estimate one-digit divide, Lockers, Mirror products, Sticky numbers, Learning Objects Divide it up, Integer cruncher, Hopper, School canteen, The divider	Teach Estimating and calculator use (multiplication) Guidelines in Number p94, 125-126, 173 People count #11, 12
4	Maths300 #84 Number charts		
5	Computer Interactive Learning Dividing up to 100, Division facts, Backwards multiplying, Spirolaterals, Common factor, Finding half, Remainders, Renaming numbers, Dividing with remainders Order of operations, Biggest number Learning Objects The divider, Divide it up, Number laws, The multiplier	Teach Division distributive law, and division of 3-digit numbers by single digit Guidelines in Number p88-91, 180-183 People count #12	Worksheet/games on estimating multiplication Active Learning 2 (N&A) Quickmaths Sets 28-30
6	RIME #6 Smorgasbord-1		

Day	Yr 6 sem 2: Towards Std 3	Towards Std 4 group(s)	Towards Std 5 group(s)
7	<p>Teach</p> <p>Division facts (reverse multiplication)</p> <p>Guidelines in Number p25</p> <p>People count #7</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N11 Checkmath</p> <p>Active Learning 2 (N&A) Quickmaths Sets 31-32</p> <p>Number boards: middle primary p43</p>	<p>Computer</p> <p>See Std 5 Day 2</p>
8	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N9 Remainder game, N11 Checkmath</p> <p>Active Learning 2 (N&A) Quickmaths Set 11</p>	<p>Computer</p> <p>See Std 4 Day 3</p>	<p>Teach</p> <p>Estimating and calculator use (division)</p> <p>Guidelines in Number p94, 125, 173</p> <p>People count #12</p>
9	Maths300 #56 Simple, elegant, elusive OR RIME 12 Circle patterns		
10	<p>Computer</p> <p>See Std 3 Day 5</p>	<p>Teach</p> <p>Order of operations</p> <p>Guidelines in Number p178-183</p> <p>People count #10</p> <p>RIME N6 Got It</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N20 Dividing by whole numbers in your head</p> <p>Active Learning 2 (N&A) Quickmaths Sets 31, 32</p>
11	RIME #6 Smorgasbord-2		
12	<p>Teach</p> <p>Inverse operations (add/sub, mult/div)</p> <p>Guidelines in Number p47</p> <p>People count #8</p>	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N12 Divisibility</p> <p>Active Learning 2 (N&A) Quickmaths Sets</p>	<p>Computer</p> <p>See Std 5 Day 2</p>
13	<p>Worksheet/games</p> <p>Active Learning 1 (N&A) N11 Checkmath</p> <p>Active Learning 2 (N&A) Quickmaths Set 12</p>	<p>Computer</p> <p>See Std 4 Day 3</p>	<p>Teach</p> <p>Dividing by 2-digit numbers (long division)</p>
14	RIME 5/6 Hangman or Bingo or MCTP p287 Hangman, or p195 Bingo bodies		
15	<p>Computer</p> <p>See Std 3 Day 5</p>	<p>Teach</p> <p>Estimating & calculator use</p> <p>Guidelines in Number p94. 125. 173</p> <p>People count #10</p>	<p>Worksheet on long division</p>