

Resources for a differentiated maths curriculum with an emphasis on Working Mathematically

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This is a listing of some of the wonderfully rich learning resources that will assist teachers to allow high quality, deep learning for understanding. Textbooks are not included below, but practice exercises of some sort are certainly needed. Sometimes games (electronic or otherwise) can meet this need in a more motivating form. A good program employs two basic principles:

- **Differentiation according to need for half the time:**

The range of students in most single year classes covers at least three VELs levels (at least six chronological years of development). For ‘toolbox’ tasks that develop the basic concepts and skills students may be grouped according to ability, usually within the one classroom. For this reason the resources are listed according to VELs level, and not year level. So resources for VELs level 3 might be used from Year 2 to Year 10.

- **Working mathematically for half the time:**

The purpose of the toolbox is to solve genuine mathematical problems, based in the world of mathematics and in the real world. Problem solving, an important component of working mathematically, is the major reason for learning the skills. Working mathematically will continually develop and practise skills, but also adds value – it enables students to develop mathematical confidence and the ability to transfer their knowledge, to use those concepts and skills elsewhere.

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Resources for a VELS Maths Curriculum NUMBER

STANDARD 1

a Count and compare

- ***Toolbox: concepts and skills***

Practical Teaching Strategies in Numeracy for children with learning difficulties (MAV)

People Count: text and/or CD (MAV) *Text for teachers, with spreadsheets for students.*

1 Numbers for identification, 2 Counting,

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Subitising,

<http://illuminations.nctm.org/ActivitySearch.aspx> *Free software from the internet*

Bobbie Bear,

<http://illuminations.nctm.org/Activities.aspx> *Free software from the internet*

Five frame, Ten frame,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Number trains

- ***Mathematical problem-solving***

Working Mathematically: Investigations (CC) *Lesson plans*

Unit 1: Early exploration of number, estimation and graphing

- ***Real problem-solving***

b Begin to add and subtract

- ***Toolbox: concepts and skills***

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Adding to 20, Adding single digits, Subtract from 20,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

- ***Mathematical problem-solving***

- ***Real problem-solving***

STANDARD 2

a Place value to 1000

- ***Toolbox: concepts and skills***

Practical Teaching Strategies in Numeracy for children with learning difficulties (MAV)

People Count: text and/or CD (MAV) *Text for teachers, with spreadsheets for students.*

3 Place value,

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Skip count to 9999,

standards.nctm.org/document/eexamples/index.htm *Free software from the internet*

4.5 Learning about Number Relationships and Properties of Numbers Using Calculators and Hundred Boards

4.6 Developing Estimation Strategies by Making Connections among Number, Geometry, Measurement, and Data Concept

<http://nlvm.usu.edu/en/nav/vlibrary.htm> National Library of Virtual Manipulatives *Free software from the internet*

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Wishball

- ***Mathematical problem-solving***

Working Mathematically: Investigations (CC) Lesson plans

Unit 2: Block game, Unit 4: Odd's a funny thing

- ***Real problem-solving***

b Mentally add and subtract to 100

- ***Toolbox: concepts and skills***

People Count: text and/or CD (MAV) Text for teachers, with spreadsheets for students.

4 Basic addition and subtraction

Interactive learning for concepts and skills (MAV) Demo on whiteboard or student use

Skip count to 140, 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

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Number partner

- ***Mathematical problem-solving***

- ***Real problem-solving***

c Simple unit fractions

- ***Toolbox: concepts and skills***

Interactive learning for concepts and skills (MAV) Demo on whiteboard or student use

Fraction bars and pies, Fractions up to 1,

standards.nctm.org/document/eexamples/index.htm *Free software from the internet*

Playing Fraction Tracks

<http://nlvm.usu.edu/en/nav/vlibrary.htm> National Library of Virtual Manipulatives *Free software from the internet*

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Fraction fiddle (comparing unit fractions), Cassowary fractions, Dynamic fractions,

- ***Mathematical problem-solving***

- ***Real problem-solving***

STANDARD 3

a Place value from 1000 to 0.01, effect of $\times 10$, $\div 10$

- ***Toolbox: concepts and skills***

Guidelines in Number (MAV) Hands-on teaching ideas

Counting: p31-32, 53-54, Pattern: p33-35, 55-56, Place value: p36, 57-58. Fractions: p37-39, 59-61, Operations: 40-49, 62-70, Problem solving: 50-52, 71-72

People Count: text and/or CD (MAV) Text for teachers, with spreadsheets for students

5 Place value, addition and subtraction,

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Money by 10 or 100, 10 or 100 times what?,

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Wishball, Decimaster

<http://illuminations.nctm.org/Activities.aspx> *Free software from the internet*

Electronic abacus,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

• **Mathematical problem-solving**

Guidelines in Number (MAV) *Hands-on teaching ideas*

Problem solving: 50-52, 71-72

Maths300 (CC) *Lesson plans*

26 Highest Number, 35 Nine & Over, 87 Making One Million,

Problem Solving Task Centre (CC) *Rich tasks for students*

4 Window Frames, 7 Consecutive Sums, 9 Row Points, 15 Domino Trails, 17 Truth Tiles 2, 30 Truth Tiles, 35 Crosses, 39 Criss-Cross Numbers, 45 Eric The Sheep, 52 Which Floor, 56 Challenge, 75 What's It Worth? 99 How Many Beans? 120 Nim, 127 Highest Number 1, 201 Rectangle Fractions, 202 Rod Mats, 203 Make The Whole, 211 Soft Drink Crates, 218 Guessing Colours Game

• **Real problem-solving**

b Add and subtract

• **Toolbox: concepts and skills**

Guidelines in Number (MAV) *Hands-on teaching ideas*

Operations: 40-49, 62-70, Problem solving: 50-52, 71-72

People Count: text and/or CD (MAV) *Text for teachers, with spreadsheets for students*

5 Place value, addition and subtraction,

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Subtract hundreds, Three circles puzzle, Checking change,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Part-adder, Take-away bars, Difference bars, Number partner

• **Mathematical problem-solving**

Guidelines in Number (MAV) *Hands-on teaching ideas*

Problem solving: 50-52, 71-72

Maths300 (CC) *Lesson plans*

14 The Farmer's Puzzle, 17 Eric The Sheep, 37 Spiders & Ants, 96 Take Away Of The Day,

Problem Solving Task Centre (CC) *Rich tasks for students*

4 Window Frames, 7 Consecutive Sums, 9 Row Points, 15 Domino Trails, 17 Truth Tiles 2, 30 Truth Tiles, 35 Crosses, 39 Criss-Cross Numbers, 45 Eric The Sheep, 52 Which Floor, 56 Challenge, 75 What's It Worth? 99 How Many Beans? 120 Nim, 127 Highest Number 1, 201 Rectangle Fractions, 211 Soft Drink Crates, 218 Guessing Colours Game

Working Mathematically: Investigations (CC) *Lesson plans*

Unit 6: Pascal patterns

RIME 5/6 (MAV) *Lesson plans*

Words add up

• **Real problem-solving**

c Multiply by single digits

• *Toolbox: concepts and skills*

Guidelines in Number (MAV) *Hands-on teaching ideas*

Counting: p31-32, 53-54, Pattern: p33-35, 55-56, Place value: p36, 57-58. Fractions: p37-39, 59-61, Operations: 40-49, 62-70, Problem solving: 50-52, 71-72

People Count: text and/or CD (MAV) *Text for teachers, with spreadsheets for students*

6 Basic multiplication

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Groups of (small), Groups of, Tables, Multiplication facts, Missing numbers, Multiplying, Number line multiplying, Multo Random, Multiple patterns,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Pebble array, Arrays, The multiplier,

• *Mathematical problem-solving*

Maths300 (CC) *Lesson plans*

17 Eric The Sheep, 87 Making One Million, 97 Tackling Times Tables

Problem Solving Task Centre (CC) *Rich tasks for students*

4 Window Frames, 7 Consecutive Sums, 9 Row Points, 15 Domino Trails, 17 Truth Tiles 2, 30 Truth Tiles, 35 Crosses, 39 Criss-Cross Numbers, 45 Eric The Sheep, 52 Which Floor, 56 Challenge, 75 What's It Worth? 99 How Many Beans? 120 Nim, 127 Highest Number 1, 211 Soft Drink Crates, 218 Guessing Colours Game

• *Real problem-solving*

d Divide by single digits, noting remainders

• *Toolbox: concepts and skills*

Guidelines in Number (MAV) *Hands-on teaching ideas*

Operations: 40-49, 62-70,

People Count: text and/or CD (MAV) *Text for teachers, with spreadsheets for students*

7 Basic division

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Dividing up to 100, Division facts, Backwards multiplying, Spirolaterals, Common factor, Finding half, Remainders, Renaming numbers, Dividing with remainders,

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

The divider, Number laws, The multiplier, Divide it up,

• *Mathematical problem-solving*

Maths300 (CC) *Lesson plans*

51 Hunting For Stars,

Problem Solving Task Centre (CC) *Rich tasks for students*

4 Window Frames, 7 Consecutive Sums, 9 Row Points, 15 Domino Trails, 17 Truth Tiles 2, 30 Truth Tiles, 35 Crosses, 39 Criss-Cross Numbers, 45 Eric The Sheep, 52 Which Floor, 56 Challenge, 75 What's It Worth? 99 How Many Beans? 120 Nim,

• *Real problem-solving*

e Number laws

• *Toolbox: concepts and skills*

People Count: text and/or CD (MAV) *Text for teachers, with spreadsheets for students*

10 Order of operations and the Distributive laws,

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Order of operations, Biggest number, Distributive laws,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

• **Mathematical problem-solving**

Maths300 (CC) *Lesson plans*

30 Truth Tiles,

Problem Solving Task Centre (CC) *Rich tasks for students*

17 Truth Tiles 2, 30 Truth Tiles,

RIME 5/6 (MAV) *Lesson plans*

Times 11

• **Real problem-solving**

f Understand, add and subtract decimals and fractions

• **Toolbox: concepts and skills**

People Count: text and/or CD (MAV) *Text for teachers, with spreadsheets for students*

13 Addition and subtraction with decimals, 14 Percentages, 15 Multiplication or division of decimals by whole numbers, 16 Multiplication of decimals by decimals, 17 Division of any number by decimal fractions, 18 Basic fractions and ratios, 19 Improper fractions and mixed numbers, 20 Fractions of amounts, 23 Equal (equivalent) fractions, 24 Fractions and decimals, 25 Fractions, division and remainders, 26 Addition or subtraction of fractions and mixed numbers,

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Decimals: Skip count decimals, Spending money, Subtracting money,

Fractions: Fractions of an amount, Rod fractions, Mixed numbers, Improper fractions, Skip count fractions, Missing fractions,

Guidelines in Number (MAV) *Hands-on teaching ideas*

Fractions: p37-39, 59-61

Fractions: pikelets and lamingtons (MAV)

Active Learning: Number and Algebra (MAV) *Worksheets*

F1 Fraction circles, F2 Fractions of things, F3 Fraction rally: a fraction dice game

<http://illuminations.nctm.org/Activities.aspx> *Free software from the internet*

Equivalent fractions,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

The Learning Federation www.thelearningfederation.edu.au/ttf2/ *Free software from the internet*

Fraction fiddle, Design briefs, Cassowary fractions, Dynamic tools

• **Mathematical problem-solving**

Problem Solving Task Centre (CC) *Rich tasks for students*

201 Rectangle Fractions, 202 Rod Mats, 203 Make The Whole, 211 Soft Drink Crates, 218 Guessing Colours Game

• **Real problem-solving**

STANDARD 4

a Place value: millions to thousandths

• **Toolbox: concepts and skills**

Guidelines in Number (MAV) *Hands-on teaching ideas*

Counting: p73-75, 103-104, Place value: p79-82, 108-111. Counting: p147-148, Pattern: 149-152, Place value: p153-156.

People Count: text and/or CD (MAV) *Text for teachers, with spreadsheets for students.*

9 Multiplication and division by powers of 10,

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Estimating decimals, Ordering decimals, Reading a scale, Powers of 10(x), Powers of 10 (\div),

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Decimaster, Wishball

standards.nctm.org/document/eeexamples/index.htm *Free software from the internet* 6.1 Learning about Multiplication Using Dynamic Sketches of an Area Model

<http://illuminations.nctm.org/Activities.aspx> *Free software from the internet*

Factor game, Factorize,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

• **Mathematical problem-solving**

RIME 5/6 (MAV) *Lesson plans*

Million

Problem Solving Task Centre (CC) *Rich tasks for students*

98 Martian Maths

• **Real problem-solving**

b Whole number computation and inverse operations

• **Toolbox: concepts and skills**

Guidelines in Number (MAV) *Hands-on teaching ideas*

Operations: p85-99, 123-142, Problem solving: p100-102, 143-146

People Count: text and/or CD (MAV) *Text for teachers, with spreadsheets for students.*

8 Tables, multiples, factors and prime numbers, 9 Multiplication and division by powers of 10, 11 Place value, distributive law and multiplication, 12 Place value, distributive law and division,

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Addition & subtraction: Three circles puzzle, Magic squares, Magic hexagon,

Multiplication: Long multiplication, Estimate to multiply, Single digit multiply, Estimate to multiply, Two digit multiply, Estimate multiplying, Long multiplication,

Division: Single digit divide, Estimate one-digit divide, Division fact rounding,

Factors: Aliquot, Bob's buttons, Odds and evens, Number of divisors, Lockers, Mirror products, Sticky numbers, Billiard ball paths,

Multiples: Multiples, Left-overs, Bob's buttons,

Primes: Prime spiral, Primed spiral, Factor tree, Factorgrams,

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Divide it up, Integer cruncher, Hopper, School canteen, The divider

standards.nctm.org/document/eeexamples/index.htm *Free software from the internet*

6.1 Learning about Multiplication Using Dynamic Sketches of an Area Model

<http://illuminations.nctm.org/Activities.aspx> *Free software from the internet*

Product game, Factor game,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

• **Mathematical problem-solving**

RIME 5/6 (MAV) *Lesson plans*

Lefdozers, Weather fine, Hangman,

Maths300 (CC) *Lesson plans*

10 Bob's Buttons, 12 Gauss Beats The Teacher, 14 The Farmer's Puzzle, 28 Number Tiles, 29 Steps, 52 Multo, 61 Doctor Dart, 62 4&20 Blackbirds, 71 Eureka, 84 Number Charts, 99 What's It Worth? 103 Palindromes

Problem Solving Task Centre (CC) *Rich tasks for students*

3 Doug's Tablecloth, 33 Dominoes, 43 Number Tiles, 62 4 & 20 Blackbirds, 80 A Dollar To Spend, 89 Doctor Dart, 91 Pick A Box, 92 Magic Squares, 109 Number Game, 123 Bob's Buttons, 144 Pascal's Triangle In Asia, 163 Eureka, 165 Change, 172 Cover Up, 176 Steps, 212 Monkeys & Bananas, 225 Add The Pack

RIME 5/6 (MAV) Lesson plans

Bingo, Mindreader

• **Real problem-solving**

c Whole number properties (inc dist law and order of operations)

• **Toolbox: concepts and skills**

People Count: text and/or CD (MAV) Text for teachers, with spreadsheets for students.

10 Order of operations and the Distributive laws, 11 Place value, distributive law and multiplication, 12 Place value, distributive law and division,

Interactive learning for concepts and skills (MAV) Demo on whiteboard or student use

Order of operations, Biggest number, Distributive multiply, Distributive divide, Multiply with powers of 10, Divide with powers of 10, Sum of squares of digits,

The Learning Federation www.thelearningfederation.edu.au/tlf2/ Free software from the internet

The multiplier

<http://nlvm.usu.edu/en/nav/vlibrary.htm> National Library of Virtual Manipulatives Free software from the internet

• **Mathematical problem-solving**

Guidelines in Number (MAV) Hands-on teaching ideas

Pattern: p76-78, 105-107, Operations: p85-99, 123-142

Maths300 (CC) Lesson plans

10 Bob's Buttons, 84 Number Charts, 99 What's It Worth?

Working Mathematically: Investigations (CC) Lesson plans

Unit 9: Calendar patterns

• **Real problem-solving**

d Fractions, decimals, percentage equivalence

• **Toolbox: concepts and skills**

People Count: text and/or CD (MAV) Text for teachers, with spreadsheets for students.

21 Percentages and fractions, 23 Equal (equivalent) fractions, 24 Fractions and decimals, 25 Fractions, division and remainders,

Interactive learning for concepts and skills (MAV) Demo on whiteboard or student use

Fractions of dollars, Fractions of time, Fractions of numbers, Fractions of money, Comparing fractions, Fraction triangles, Equal circle fractions, Equal square fractions, Equal line fractions, Equal block fractions, Clock fractions, Graph fractions.

Estimating decimals, Fractions of a dollar, Guitar fractions,

Percentage square, Percentage pie, Percentage line, Percentage fraction, Percentage full, Percentage rectangle, Dividing strips, Sharing dampers, Dividing money, Steps, Remainders, Dividing with remainders,

Guidelines in Number (MAV) Hands-on teaching ideas

Fractions: p83-84

Active Learning: Number and Algebra (MAV) Worksheets

F1 Fraction circles, F2 Fractions of things, F3 Fraction rally: a fraction dice game

The Learning Federation www.thelearningfederation.edu.au/tlf2/ Free software from the internet

Design briefs, Fraction fiddle, Dynamic tools, Decimaster

<http://illuminations.nctm.org/Activities.aspx> Free software from the internet

Fraction game, Fraction model (I, II, III),

<http://nlvm.usu.edu/en/nav/vlibrary.htm> National Library of Virtual Manipulatives Free software from the internet

• **Mathematical problem-solving**

Maths300 (CC) Lesson plans

9 First Principles Percent, 33 Estimating Fractions, 144 Rod Mats

RIME: Number (MAV) Lesson plans

19 Clock fractions, 20 Compass fractions, 21 Estimation with fractions, 22 Fractions of whole numbers, 23 Fractions by comparing lengths,

RIME 5/6 (MAV) Lesson plans

This goes with this, Newspaper fractions

Problem Solving Task Centre (CC) Rich tasks for students

177 Making Fractions 2, 205 Peg & Tape Fractions

• **Real problem-solving**

e Ratios, and equivalences

• **Toolbox: concepts and skills**

People Count: text and/or CD (MAV) Text for teachers, with spreadsheets for students.

18 Basic fractions and ratios, 22 Comparing fractions and ratios,

Interactive learning for concepts and skills (MAV) Demo on whiteboard or student use

Right-angled triangles,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

Percentages,

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Squirt, Scale matters

• **Mathematical problem-solving**

RIME: Number (MAV) Lesson plans

29 Sharing by ratio, 30 Finding scale factors, 31 Same-shape rectangles,

• **Real problem-solving**

f Add, subtract and multiply fractions and decimals

• **Toolbox: concepts and skills**

People Count: text and/or CD (MAV) Text for teachers, with spreadsheets for students.

13 Addition and subtraction with decimals, 15 Multiplication or division of decimals by whole numbers, 16 Multiplication of decimals by decimals, 17 Division of any number by decimal fractions, 19 Improper fractions and mixed numbers, 20 Fractions of amounts, 26 Addition or subtraction of fractions and mixed numbers, 27 Multiplication of fractions,

Interactive learning for concepts and skills (MAV) Demo on whiteboard or student use

Decimals: Subtracting money, Ones times tenths, Tenths times tenths, Multiply by tenths, Estimate to multiply, Estimate to divide (by whole numbers), Missing decimals, Wage sheet,

Fractions: Add circle fractions, Add strip fractions, Add fractions, Subtract fractions, Fractions of (circles), Fractions of (strips), Fractions of (rectangle),

RIME: Number (MAV) Lesson plans

24 Order of fractions, 25 Equal fractions, 26 Card thickness, 27 Adding and subtracting fractions, 28 Multiplying fractions

• **Mathematical problem-solving**

• **Real problem-solving**

STANDARD 5

a Factors, multiples, powers, roots

• *Toolbox: concepts and skills*

Guidelines in Number (MAV) Hands-on teaching ideas

Operations: p168-187, Problem solving: p188-191

Active Learning: Number and Algebra (MAV) Worksheets

N5 Patterns in the multiplication table, N11 Checkmath, N12 Divisibility, N13 Card games for factors, N14 Investigating primes, N15 Factorgram diagrams, N29 Factors and products,

People Count: text and/or CD (MAV) Text for teachers, with spreadsheets for students.

8 Tables, multiples factors and primes,

Interactive learning for concepts and skills (MAV) Demo on whiteboard or student use

Aliquot, Number of divisors, Factor tree, Factorgrams, Lockers, Multiples, Prime factors to 1000, Square numbers, Units digits of powers, Biorhythms,

• *Mathematical problem-solving*

RIME: Number (MAV) Lesson plans

6 Smorgasbord, 7 Checkmath, 8 Line up, 9 Liquorice Factory, 10 Factorgrams,

Maths300 (CC) Lesson plans

52 Multo, 56 Simple, Elegant, Elusive, 101 Odds & Evens,

• *Real problem-solving*

b Calculations with whole numbers

• *Toolbox: concepts and skills*

Active Learning: Number and Algebra (MAV) Worksheets

N1 Magic squares, N2 Building the greatest, N3 Number sentences, N4 Number facts through card games, N5 Patterns in the multiplication table, N6 Sticky numbers, N7 Mirror products, N8 Sequences, N9 Remainder game, N10 The game of 31, N20 Dividing by whole numbers in your head,

Interactive learning for concepts and skills (MAV) Demo on whiteboard or student use

Guzintas,

The Learning Federation www.thelearningfederation.edu.au/ttf2/ Free software from the internet

The multiplier, The divider, School canteen, Take-away bars, Difference bars

• *Mathematical problem-solving*

RIME: Number (MAV) Lesson plans

1 Palindromes, 2 Estimating multiplication, 3 Times 99, 4 Odds and evens, 6 Smorgasbord, 11 Add the numbers 1 to 100, 12 Circle patterns, 13 Russian multiplication, 14 Estimating division, 15 Happy numbers, 16 Magic squares, 17 Game of '31', 18 '1089',

Maths300 (CC) Lesson plans

12 Gauss Beats The Teacher, 14 The Farmer's Puzzle, 30 Truth Tiles, 52 Multo, 56 Simple, Elegant, Elusive, 63 Arithmagons, 66 Dominoes, 78 Row Points, 84 Number Charts, 99 What's It Worth? 101 Odds & Evens, 103 Palindromes, 105 Goldbach's Conjecture,

Problem Solving Task Centre (CC) Rich tasks for students

3 Doug's Tablecloth, 7 Consecutive Sums, 9 Row Points, 10 Find My Pattern, 33 Dominoes, 75 What's It Worth? 109 Number Game, 138 Four Bean Mix, 194 Arithmagons 2218 Guessing Colours Game, 225 Add The Pack

Active Learning: Number and Algebra (MAV) Worksheets

N1 Magic squares, N2 Building the greatest, N3 Number sentences, N4 Number facts through card games, N5 Patterns in the multiplication table, N6 Sticky numbers, N7 Mirror products, N8 Sequences, N9 Remainder game,

• *Real problem-solving*

RIME: Number (MAV) Lesson plans

5 Readability,

Working Mathematically: Investigations (CC) Lesson plans

Unit 14: Sizes of the planets, Unit 17: Packaged holidays

c Calculations with fractions, decimals and percentages

• Toolbox: concepts and skills

People Count: text and/or CD (MAV) Text for teachers, with spreadsheets for students.

16 Multiplication of decimals by decimals, 17 Division of any number by decimal fractions, 18 Basic fractions and ratios, 19 Improper fractions and mixed numbers, 20 Fractions of amounts, 21 Percentages and fractions, 22 Comparing fractions and ratios, 23 Equal (equivalent) fractions, 24 Fractions and decimals, 25 Fractions, division and remainders, 26 Addition or subtraction of fractions and mixed numbers, 27 Multiplication of fractions,

Interactive learning for concepts and skills (MAV) Demo on whiteboard or student use

Multiply with powers of 10, Divide with powers of 10, Multiply & divide by decimals, Decimal dividing, Percentage problems, Interest, Compound interest,

The Learning Federation www.thelearningfederation.edu.au/tlf2/ Free software from the internet

Design briefs

RIME: Number (MAV) Lesson plans

24 Order of fractions, 25 Equal fractions, 26 Card thickness, 27 Adding and subtracting fractions, 28 Multiplying fractions

Active Learning: Number and Algebra (MAV) Worksheets

F4 Fractions on a graph, F5 Fraction magic squares and unit fractions, F6 Reciprocals and dividing, F7 Counter abacus, F8 Order of operations, F9 Mentally adding and subtracting, F10 Number hunt and Build-a- problem, F11 Converting decimals to fractions, F12 Dividing by decimals in your head, F13 Estimating percentages, F14 Percentage in your head, F15 Percentage circles

• Mathematical problem-solving

Maths300 (CC) Lesson plans

9 First Principles Percent, 33 Estimating Fractions, 72 Fraction Magic Square, 77 Rectangle Fractions, 135 Chocolate Cake, 144 Rod Mats,

Problem Solving Task Centre (CC) Rich tasks for students

37 Fraction Magic Square, 177 Making Fractions 2, 199 Making Fractions 3, 201 Rectangle Fractions, 202 Rod Mats, 203 Make The Whole, 205 Peg & Tape Fractions,

• Real problem-solving

Active Learning: Number and Algebra (MAV) Worksheets

N30 You are what you eat, N31 How energetic are you? N32 Bike speeds,

Maths at Work (MAV) Student text on CD

Maths at work, Doing maths, Moving out, Percentages, Earning money, Budgeting, Investment, Inflation and annuities, Credit, Food & clothing, Transport, Leisure, Service costs

Spreadsheets for concepts and skills (MAV) Demo on whiteboard or student use

Being paid, PAYG tax, Personal budget, Credit card1, Credit card2, Hire purchase, Personal loan, Compound interest, Mortgage, Car rental, Used car, Energy use,

d Calculations with positive & negative numbers

• Toolbox: concepts and skills

People Count: text and/or CD (MAV) Text for teachers, with spreadsheets for students.

30 Integers and subtraction

Interactive learning for concepts and skills (MAV) Demo on whiteboard or student use

Walk to add or subtract, Add integers, Subtract integers, Multiply integers, Multiplication nomogram, Multiplying any numbers,

Active Learning: Number and Algebra (MAV) Worksheets

N21 Games for adding integers, N22 Slide rule and nomogram for adding, N23 Magic squares with integers, N24 Mystery squares, N25 Games for subtracting integers, N26 Walking and subtracting, N27 Slide rule and nomogram for subtracting, N28 Card games for integers,

Sample units of work (free from www.vcaa.vic.edu.au/prep10/csf/support/sampleunits/sample_units.html)

Introducing integers, Calendar maths,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

Color chips – addition, Color chips – subtraction,

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Integer cruncher,

• **Mathematical problem-solving**

Maths300 (CC) *Lesson plans*

32 Walk The Plank, 76 Protons & Antiprotons,

Problem Solving Task Centre (CC) *Rich tasks for students*

47 Red/Black Card Game, 130 Protons & Anti-protons,

• **Real problem-solving**

f All equivalences, including ratio and proportion

• **Toolbox: concepts and skills**

Guidelines in Number (MAV) *Hands-on teaching ideas*

Fractions: p157-167

People Count: text and/or CD (MAV) *Text for teachers, with spreadsheets for students.*

28 Proportion and rates, 29 Find 100% given a fraction or percentage,

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Ratio on a number line, Fractions to percentages, Spirograph, Estimating ratios, Right-angled triangles, Sharing by ratio, Proportion, Orange cordial, Proportional cordial,

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

Squirt, Measures, Foul Foodmaker

• **Mathematical problem-solving**

Active Learning: Number and Algebra (MAV) *Worksheets*

N33 Proportion concept test, N34 Finding the whole thing,

RIME: Number (MAV) *Lesson plans*

29 Sharing by ratio, 30 Finding scale factors, 31 Same-shape rectangles, 32 Enlarging cartoons, 33 Slopes, 34 Garbage-bag kite, 35 Spirograph

• **Real problem-solving**

g Exponent laws, base 2 calculations, sets of numbers

• **Toolbox: concepts and skills**

Active Learning: Number and Algebra (MAV) *Worksheets*

N16 Multiplying by doubling and halving, N17 Some uses of powers of 2, N18 A human binary counter, N19 The A-series of paper sizes

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Base 5, Base 2, Roman, Exponent laws, Ten-clocks, Scientific notation,

<http://nlvm.usu.edu/en/nav/vlibrary.html> National Library of Virtual Manipulatives *Free software from the internet*

Chip abacus,

• **Mathematical problem-solving**

• **Real problem-solving**

STANDARD 6

a Euclidean algorithm (for 'lowest common multiple')

• *Toolbox: concepts and skills*

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Diophantine equations, Bob's buttons, Left-overs,

www.mathpages.com/home/kmath384.htm *Free software from the internet*

• *Mathematical problem-solving*

Maths300 (CC) *Lesson plans*

10 Bob's Buttons,

• *Real problem-solving*

b Estimation and computation with all rationals (inc fractions)

• *Toolbox: concepts and skills*

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Estimate to multiply, Estimate multiplying, Estimate one-digit divide, Estimate to divide, Division fact rounding, Repeating decimals, Decimals to fractions, Scientific notation, Multiplying any numbers,

The Learning Federation www.thelearningfederation.edu.au/tlf2/ *Free software from the internet*

The multiplier, Design briefs, The divider

• *Mathematical problem-solving*

Maths300 (CC) *Lesson plans*

97 Tackling Times Tables, 98 Magic Squares, 102 Take Away Tiles, 112 Crosses, 113 Monkeys & Bananas, 139 Consecutive Sums, 140 Square Pairs, 143 Ice-Cream Flavours

Problem Solving Task Centre (CC) *Rich tasks for students*

4 Window Frames, 5 Make A Snake, 17 Truth Tiles 2, 35 Crosses, 43 Number Tiles, 54 Fay's Nines, 62 4 & 20 Blackbirds, 89 Doctor Dart, 92 Magic Squares, 118 Ice-cream Flavours, 137 Training For Maths, 174 Magic Cube, 176 Steps, 180 Pizza Toppings, 190 Magic Hexagon, 210 Division Boxes, 212 Monkeys & Bananas, 215 Take Away Tiles, 216 Square Pairs, 222 Making Fractions 1

• *Real problem-solving*

Maths at Work (MAV) *Student text on CD*

1 Maths at work, 2 Doing mathematics, 5 Moving out, 6 Income and tax, 7 Budgeting, 8 Investments, 9 Inflation and insurance, 10 Credit, 11 Food and clothing costs, 12 Transport costs, 13 Leisure costs, 14 Service costs

Active Learning: Number and Algebra (MAV) *Worksheets*

N35 Percentage increases and decreases

Working Mathematically: Investigations (CC)

Unit 18: Font sizes

Recreation (MAV) *Applications based student text*

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Annuity, Being paid, Reducing balance loan, Tax return, Personal loan, Car rental,

c Irrational numbers & surds - meaning and simple computations

• *Toolbox: concepts and skills*

Interactive learning for concepts and skills (MAV) *Demo on whiteboard or student use*

Ratios of squares, Pythagorean spiral, Square roots, Surd operations, Fractional exponents, Exponent laws,

• *Mathematical problem-solving*

• *Real problem-solving*