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KS2 Multiplication and Division Teacher's Notes

Series consultant – Anita Straker

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Series consultant Anita Straker

Project consultants BEAM Education, Lynda Maple

Authors Pete Crawford, Sara Fielder, Gill Potter, Tung Ken Lam

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Introduction

All activities in the Mult-e-Maths Strand CD-ROMs are accompanied by teacher’s notes, which are included on the CD-ROMS as PDFs. This pre-printed pack is designed to save you printing time, providing a ready-to-use resource that you can file in a ring-binder alongside your maths planning.

The pack consists of four parts, one for each of Years 3, 4, 5 and 6. In each part there are:

- a list of contents, including the titles of the on-screen activities and brief descriptions of them;
- a planning grid linking activities to objectives in the National Numeracy Strategy *Framework for teaching mathematics* (see below for further details);
- teacher’s notes for starters and then lessons (see overleaf for further details).

Planning

The **planning grids** included in this pack are designed to help you to incorporate the Mult-e-Maths Strands into your planning.

The left-hand column of each grid shows NNS *Framework* objectives for the appropriate strand and year. They appear in the same order as in the *Framework*.

The right-hand column shows the starter and lesson activities that match each objective. (Lessons are shaded to enable you to distinguish between starters and lessons more easily.)

Note: The grids show the main learning objective for each activity, whereas the teacher’s notes also detail any linked objectives.

The Mult-e-Maths Strands do not cover all of the NNS *Framework* objectives, but are designed to support other methods of effective teaching, including practical and pencil and paper work.

Medium term plans can be downloaded from the Mult-e-Maths website. These show how each Mult-e-Maths Strand activity can be mapped into your termly planning. They are provided in Microsoft Word ® format to enable you to adapt them to your own school plans.

Clicking on the Mult-e-Maths icon on any screen of a Mult-e-Maths Strand will take you directly to the website at:

www.cambridge-hitachi.com/multemaths/

The medium term plans can be accessed from the ‘Ideas and inspiration’ section.



Mult-e-Maths and the National Numeracy Strategy Framework – Addition and Subtraction Year 3 Planning grid

Year 3 Framework objectives (continued)	Mult-e-Maths Starters and Lessons (continued)
(p33) Add by partitioning into tens and units, then recombining	AS3S6 Partitioning Finding the answers to additions where partitioning into tens and units might be a useful strategy
	AS3S13 Using tens and units Adding pairs of 2-digit numbers by partitioning into tens and units
	AS3L3 Partitioning and addition Partitioning numbers into tens and units to help with addition
	AS3L16 Adding larger numbers Adding larger numbers by splitting them into their place value parts and with the aid of jottings
(p33) Find a small difference by counting up from the smaller to the larger number	AS3S12 Counting up Solving subtractions by counting up
	AS3L9 Small differences Using counting up from the smaller number to solve subtractions and deciding when this method is most appropriate
	AS3L10 Changing the order Finding the missing number in addition problems by changing the order of the numbers
(p33) Identify near doubles, using doubles already known	AS3S21 Near doubles Using known doubles to solve near doubles
	AS3L12 Near doubles Using near doubles when adding
(p35) Add and subtract mentally a 'near multiple of 10' to or from a 2-digit number, by adding or subtracting 10, 20, 30... and adjusting	AS3S19 Adding and adjusting Adding 9, 19, 29, ... 99 to 2-digit numbers
	AS3S20 Subtracting and adjusting Subtracting 9, 19, 29, ... 99 from 2-digit numbers
	AS3L8 Using near multiples of 10 Adding and subtracting mentally using near multiples of 10 and adjusting
(p35) Use patterns of similar calculations	AS3S8 Using patterns Spotting inconsistencies in patterns of calculations and using the patterns to find the answers to other calculations
	AS3L14 Similar calculations Identifying patterns of similar calculations and using them to solve other additions and subtractions
(p35) Say or write a subtraction statement corresponding to a given addition statement, and vice versa	AS3S3 Matching additions and subtractions Using knowledge of number facts to 20 to make additions and matching subtractions
	AS3L6 Number facts to 20 Finding pairs of numbers with a given total up to 20 and identifying corresponding subtraction facts
	AS3S22 Add and subtract mentally Adding and subtracting mentally without crossing the tens boundary
(p37, 38) Use known number facts and place value to add/subtract mentally	AS3S24 Using known number facts Finding the missing numbers in additions and subtractions and using one number fact to solve other additions and subtractions
	AS3L18 Number facts and place value Using known number facts and place value to help mental calculation

Planning grid for Addition and Subtraction Year 3

Year 3 sample plan: Autumn term, part 1						
EVERY DAY: Practise and develop oral and mental skills (e.g. counting, mental strategies, rapid recall of +, −, × and ÷ facts). Read and write whole numbers up to 1000. Add/subtract 1, 10 and 100 to/from any whole number. Count on/back in 10s and 100s from any 2- or 3-digit number. Recall addition and subtraction facts for each number to at least 10. Recall pairs of whole numbers that total 20. Derive doubles of whole numbers to 15, and corresponding halves. Recall multiplication facts for 5 times-table, and derive division facts. Recall multiplication facts for 10 times-table, and derive division facts. Recall multiplication facts for 2 times-table, and derive division facts.						
Unit	Days	Pages	Topic	Objectives: children will be taught to ...	Mult-e-Maths starter reference	Mult-e-Maths lesson reference
1	3	8–19	Place value, ordering, estimating, rounding	Read and write whole numbers to 1000 in figures and words. Know what each digit represents, and partition 3-digit numbers into a multiple of 100, a multiple of 10, and ones. Read and begin to write the vocabulary of estimation. Estimate up to 100 objects.	NS3S4 NS3S12 NS3S3 NS3S1 SS3S13	NS3L2 NS3L3 NS3L1
		76–77	Reading numbers from scales	Read scales to the nearest division.		
2–3	10	24–29	Understanding + and −	Extend understanding of the operations of addition and subtraction. Read and begin to write related vocabulary. Use +, − and × signs. Recognise that addition can be done in any order. Recognise all coins and notes. Understand £, p notation (e.g. £3.06). Pencils, coins, give change and work out how to pay.		
		66–69	Money and 'real life' problems	Put the larger number first to count on. Identify near doubles. Bridge through a multiple of 10 and adjust.	AS3S11 AS3S21 AS3S17 AS3S16 AS3S23	AS3L15 SP3L6 AS3L13 AS3L12 AS3L7
		32–41	Mental calculation strategies (+ and −)	Choose appropriate number operations and calculation methods to solve word problems. Explain and record methods informally. Check sums by adding in different order.		SP3L1
		58–61	Making decisions, checking results	Say the number that is 1, 10 or 100 more, or less, than any given 2- or 3-digit number. Read time to 5 minutes. Read and begin to write the vocabulary related to length. Use a ruler to draw and measure lines to the nearest half cm. Read scales to the nearest division. Use decimal notation for m and cm. Measure and compare using m and cm. Know the relationships between m and cm, km and m. Suggest suitable units and equipment to estimate or measure lengths, including km. Round to nearest whole/half unit, or as mixed units (e.g. 3m 20cm). Choose an appropriate number operation and calculation method to solve word problems. Explain and record methods informally. Classify and describe 2-D and 3-D shapes, referring to reflective symmetry, faces, sides/edges, vertices, angles. Read and begin to write the vocabulary of position. Use spaces on square grids. Identify right angles in 2-D shapes and in the environment. Investigate general statements about shapes.	NS3S2, NS3S11 SS3S9	NS3L4 SS3L6 SS3L7
4–6	13	70–77	Place value, ordering, estimating, rounding Measures, including problems			
7	2	80–89	Shape and space		SS3S1, SS3S3 SS3S15 SS3S5	SS3L2 SS3L3
		62–65	Reasoning about shapes Assess and review			

Sample medium term plans for Year 3

Each strand except Solving Problems consists of separate starters and lessons to enable you to mix and match starter and lesson activities appropriate to your planning. (The starters for Solving Problems are incorporated within the lessons, because each starter is designed to revise specific maths skills needed in the problem-solving lesson activity.) All of the activities are accompanied by teacher's notes.

The teacher's notes for starters include the following sections:

- **Objective(s)** from the *NNS Framework*
- **Prior knowledge and skills** to help you to plan when it is appropriate to incorporate this activity into your teaching
- **Vocabulary**
- **Resources**
- **Main teaching activity** to give a suggested order of teaching, plus notes on using the Mult-e-Maths activity
- **Probing questions**

In addition to these sections, teacher's notes for lessons may also include some or all of the following:

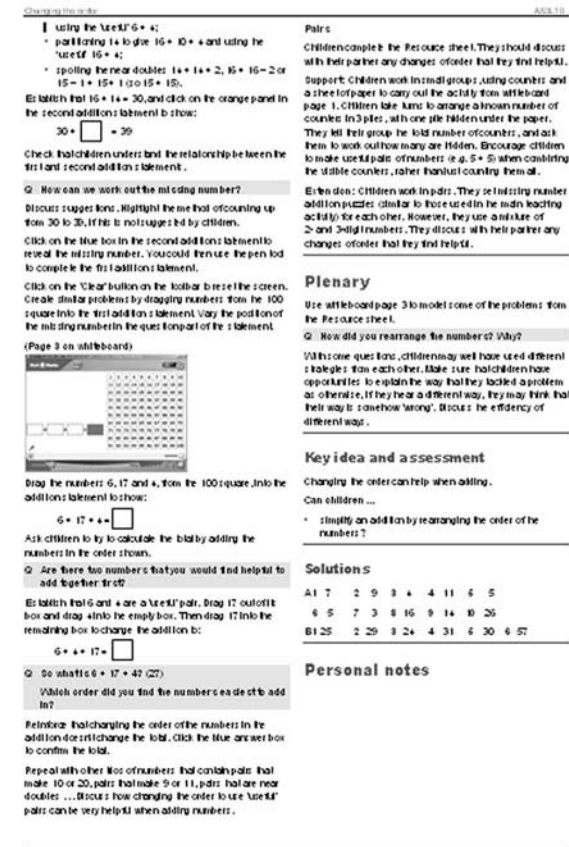
- **Differentiated pupil activities**
- **Plenary**
- **Key idea and assessment** to suggest a focus for what to assess during the plenary
- **Solutions** to pupil activities

For ease of reference, each activity and its accompanying teacher's notes are coded, for example:

- FD6S17 means Year 6 Starter 17 of the Fractions, Decimals, Percentages, Ratio and Proportion Strand.
- AS3L7 means Year 3 Lesson 7 of the Addition and Subtraction Strand.

The codes for the six Mult-e-Maths Strands are:

FD	Fractions, Decimals, Percentages, Ratio and Proportion
NS	Numbers and the Number System
AS	Addition and Subtraction
MD	Multiplication and Division
SS	Measures, Shape, Space and Handling Data
SP	Solving Problems



Sample teacher's notes for AS3L10

Multiplication and Division

Year 3 Contents

Planning grid

Starters

MD3S1	2, 5 and 10 times-tables Identifying numbers that are answers in the 2, 5 and 10 times-tables
MD3S2	The 3 and 4 times-tables Applying knowledge of the 3 and 4 times-tables
MD3S3	Multiplying by 10 and 100 Using knowledge of multiplying by 10 and 100
MD3S4	Dividing by 2, 5 and 10 Choosing three numbers to make a division sentence
MD3S5	Sharing and grouping Using sharing and grouping methods to solve divisions
MD3S6	Doubling Finding and using doubles of integers to 20
MD3S7	Doubling multiples of 5 Identifying which multiples of 5 give specified answers when they are doubled
MD3S8	Using multiplication and division facts Using knowledge of multiplication and division facts to solve number puzzles
MD3S9	Halving Finding halves and using partitioning and doubling methods to check answers
MD3S10	Multiplying multiples of 10 Using knowledge of times-table facts to multiply multiples of 10

Lessons

MD3L1	Order of multiplying Making and describing arrays to reinforce that multiplication can be done in any order
MD3L2	Multiplying by 10 Using place value to multiply by 10
MD3L3	Getting back to the start number Dividing to reverse the effect of multiplying and vice versa
MD3L4	Finding doubles Finding doubles of numbers greater than 10
MD3L5	Multiplying 2-digit numbers Multiplying 2-digit numbers by splitting them into their place value components
MD3L6	Remainders Finding remainders using visual representations and knowledge of times-tables
MD3L7	Rounding after division Deciding whether to round up or down after division

Multiplication and Division

Year 4 Contents

Planning grid

Starters

MD4S1	Doubling and halving numbers to 20 Practising giving doubles of whole numbers to 20 and their corresponding halves
MD4S2	Doubling and halving numbers to 50 Practising giving doubles of whole numbers to 50 and the corresponding halves
MD4S3	Multiplication facts for 2, 3, 4, 5 and 10 Using multiplication facts for 2, 3, 4, 5 and 10, and related division facts, to solve number puzzles
MD4S4	Times-tables, doubles and halves Solving problems using knowledge of multiplication facts, and doubling and halving
MD4S5	Making a product Finding all the multiplications involving pairs of whole numbers that have a product of 24
MD4S6	Remainders and money Using times-tables facts to solve divisions with remainders, and relating remainders to money amounts
MD4S7	Doubling and halving multiples of 10 Solving puzzles by doubling and halving multiples of 10 and applying this to solving problems
MD4S8	Doubling and halving multiples of 100 Solving puzzles by doubling and halving multiples of 100
MD4S9	Multiplying by 9 and 11 Using knowledge of how to multiply by 10 to multiply 2-digit numbers by 9 and 11
MD4S10	Multiplying by 6 Using multiplication facts for 2 and 4 to multiply by 6
MD4S11	Multiplying by 8 Use strategies to multiply by 8, to help develop knowledge of the 8 times-table
MD4S12	Times-tables recall Multiplying pairs of single-digit numbers and deducing answers given one single-digit number in a pair
MD4S13	Finding multiplications Identifying multiplications from given products
MD4S14	Multiplying by partitioning Partitioning the 2-digit number in a $TU \times U$ multiplication to make multiplying easier
MD4S15	Finding and using multiplication facts Deducing multiplication facts for 13 from known facts, and using them to solve divisions with remainders
MD4S16	Informal written method for division Consolidating the informal written method of division that involves subtracting multiples of the divisor

Lessons

MD4L1	Doubling and halving Doubling and halving by partitioning first, and using doubles and halves to multiply and divide
MD4L2	Informal method for multiplication Approximating answers to multiplications and solving them using the grid method
MD4L3	Relationships between operations Identifying and applying relationships between multiplication and division
MD4L4	Dividing money amounts Applying understanding of division and remainders in the context of money
MD4L5	Multiplying by partitioning Partitioning numbers so that multiplications can be solved using known facts

Lessons (continued)

MD4L6	Multiplying using factors Using factors of 2-digit numbers to make multiplying easier
MD4L7	Standard method of written multiplication Developing a standard written method of solving $TU \times U$ from the grid method
MD4L8	Using doubling and halving Reinforcing how partitioning can help with doubling and halving, and solving problems involving doubling and halving
MD4L9	Calculating and checking Solving multiplication and division problems and checking the results using an inverse operation
MD4L10	Rounding up or down after division Using division to solve word problems involving remainders, and rounding up or down depending on the context
MD4L11	Known facts and place value Using times-tables facts to multiply 2-digit numbers by single-digit numbers
MD4L12	Dividing bigger numbers Beginning to use a 'chunking' method to solve divisions
MD4L13	Informal method of written division Using a 'chunking' method to divide, and beginning to record the method systematically

Multiplication and Division

Year 5 Contents

Planning grid

Starters

MD5S1	Doubles of numbers to 100 Practising finding doubles of whole numbers to 100 and the corresponding halves
MD5S2	Using times-tables facts Completing multiplication grids given some heading numbers and some entries
MD5S3	What's the number? Using knowledge of times-tables facts to identify a number from clues
MD5S4	Multiplication grid Identifying missing numbers in fragments of a multiplication grid
MD5S5	Product game Identifying pairs of numbers with a given product
MD5S6	Finding division facts Using knowledge of times-tables to deduce all the possibilities for the missing numbers in a division sentence
MD5S7	Doubles of multiples of 10 to 1000 Practising finding doubles of multiples of 10 to 1000 and the corresponding halves
MD5S8	Divisions with decimal answers Dividing whole numbers by single digits to produce decimal answers, and checking answers using multiplication
MD5S9	Using multiplication by 11 Using multiplying by 11 as an aid to adding a sequence of ten numbers where a number in the sequence is the sum of the two previous numbers
MD5S10	Use doubling and halving Using doubling and halving to change ounces to grams and pounds to ounces
MD5S11	Egyptian multiplication Comparing the Ancient Egyptian method of multiplication (which is based on doubling and partitioning) with other methods
MD5S12	Applying division Using mental division strategies to compare the nutritional information for a chocolate bar with that of a banana
MD5S13	Broken calculator multiplications Using factors to enter multiplications on a calculator whose number 2 key is 'broken'
MD5S14	Broken calculator divisions Using factors to enter divisions on a calculator whose number 2 key is 'broken'
MD5S15	Related facts Using a known multiplication fact to find the answers to related multiplications and divisions mentally
MD5S16	Lattice multiplication Using the lattice method of multiplication, and checking answers using mental strategies
MD5S17	Short multiplication Using missing number column multiplications to review the method of short multiplication

Lessons

MD5L1	Doubling and halving Using doubling and halving to make multiplication easier
MD5L2	Fractions of numbers Finding fractions of numbers by using familiar fractions
MD5L3	Written division Developing an informal written method, using multiples of the divisor, for division of HTU by U
MD5L4	Written division with remainders Developing informal written methods for division of HTU by U with remainders
MD5L5	Rounding after division Solving word problems using division where rounding is required
MD5L6	Using brackets Investigating the use of brackets on calculations
MD5L7	Splitting larger numbers Multiplying 2-digit numbers by single-digit numbers, by splitting the 2-digit numbers into smaller parts
MD5L8	Using factors to multiply Using factors to multiply larger numbers
MD5L9	Using factors to divide Using factors to divide larger numbers
MD5L10	Remainders and fractions Expressing remainders as fractions
MD5L11	Using a calculator Using a calculator to solve word problems involving multiplication and division
MD5L12	Multiplying puzzles Solving puzzles that involve finding products of single-digit numbers, doubling and trebling
MD5L13	Using known facts Using the answer from one calculation to help with another
MD5L14	The grid method of multiplication Developing informal written methods to multiply TU × TU

Multiplication and Division

Year 6 Contents

Planning grid

Starters

MD6S1	Multiplication facts Recalling multiplication facts
MD6S2	Doubling and halving decimals Finding doubles and halves of decimals
MD6S3	Doubling and halving multiples of ten Finding doubles and halves of multiples of 10
MD6S4	Multiplying by teens Using known multiplication facts to find larger multiples
MD6S5	Consolidating mental calculation Practising mental multiplication and division of integers and decimals
MD6S6	Estimating answers to divisions Using knowledge of multiplication facts and/or rounding to estimate the answers to divisions
MD6S7	Missing number multiplications Using times-tables facts to identify the missing numbers in diagrams involving multiplication
MD6S8	Making products Using single-digit numbers to make a target product
MD6S9	Shared products Using known multiplication facts to find products that are common to two numbers
MD6S10	Decimal jumps Multiplying single-digit numbers by decimals, with tenths only
MD6S11	Applying times-tables facts Using times-tables facts to multiply multiples of 10, 100 and 1000
MD6S12	Missing number multiplication grids Identifying missing numbers in multiplication grids
MD6S13	Using known facts to divide Finding missing numbers in division sentences
MD6S14	Making multiplications and divisions Using a given set of numbers to make as many multiplication and division sentences as possible
MD6S15	Multiplying by partitioning Using partitioning to multiply 2-digit numbers by 1-digit numbers
MD6S16	Investigating the sum of products Investigating how to arrange given numbers in a sum of two products to produce the largest and smallest answers
MD6S17	Division facts Recalling, or deriving, division facts

Lessons

MD6L1	Making larger multiples Using known multiplication facts up to 10 × 10 to find multiplication facts for larger numbers
MD6L2	Using doubling and halving Using doubling and halving to multiply larger numbers
MD6L3	Egyptian and Russian multiplication Using methods involving doubling and halving to multiply larger numbers
MD6L4	Splitting numbers Multiplying 2- and 3-digit integers, and 2-digit decimals with one decimal place, by breaking them into manageable parts

Lessons (continued)

MD6L5	Multiplication with decimals Using pencil and paper methods to multiply decimal numbers by breaking them into their place value components
MD6L6	Using multiples with division Developing an informal written method, for division of HTU by TU, that uses multiples of the divisor
MD6L7	Related calculations Using the relationship between multiplication and division to help with calculating
MD6L8	Related calculations with decimals Using the relationship between multiplication and division with decimal numbers
MD6L9	Using factors Using factors to help multiply pairs of 2-digit numbers
MD6L10	Dividing decimals Developing informal written methods to divide numbers with one decimal place by single-digit integers
MD6L11	The grid method of multiplication Developing use of the grid method to multiply ThHTU by U and HTU by TU
MD6L12	Solving real life problems Solving single-step and multi-step problems that involve some multiplication or division
MD6L13	Using the calculator's memory Using the memory function of a calculator to solve multi-step problems that involve some multiplication or division
MD6L14	Division and decimals Using a calculator to solve division problems that involve numbers with up to two decimal places

Multiplication and Division Year 3

Planning grid

Year 3 Framework objectives	Mult-e-Maths Starters and Lessons
(p47) Extend understanding that multiplication can be done in any order	MD3L1 Order of multiplying Making and describing arrays to reinforce that multiplication can be done in any order
(p49) Understand division as grouping (repeated subtraction) or sharing. Read and begin to write the related vocabulary	MD3S5 Sharing and grouping Using sharing and grouping methods to solve divisions
(p49) Recognise that division is the inverse of multiplication , and that halving is the inverse of doubling	MD3L3 Getting back to the start number Dividing to reverse the effect of multiplying and vice versa
(p51) Begin to find remainders after simple division	MD3L6 Remainders Finding remainders using visual representations and knowledge of times-tables
(p51) Round up or down after division, depending on the context	MD3L7 Rounding after division Deciding whether to round up or down after division
(p53) Know by heart multiplication facts for the 2, 5 and 10 times-tables	MD3S1 2, 5 and 10 times-tables Identifying numbers that are answers in the 2, 5 and 10 times-tables
	MD3S8 Using multiplication and division facts Using knowledge of multiplication and division facts to solve number puzzles
(p53) Begin to know the 3 and 4 times-tables	MD3S2 The 3 and 4 times-tables Applying knowledge of the 3 and 4 times-tables
(p53) Derive quickly division facts corresponding to the 2, 5 and 10 times-tables	MD3S4 Dividing by 2, 5 and 10 Choosing three numbers to make a division sentence
(p53) Derive quickly doubles of all whole numbers to at least 20	MD3S6 Doubling Finding and using doubles of integers to 20
	MD3L4 Finding doubles Finding doubles of numbers greater than 10
(p53) Derive quickly doubles of multiples of 5 to 100	MD3S7 Doubling multiples of 5 Identifying which multiples of 5 give specified answers when they are doubled
(p53) Derive quickly all halves corresponding to doubles of whole numbers to 20, multiples of 5 to 100 and multiples of 50 to 500	MD3S9 Halving Finding halves and using partitioning and doubling methods to check answers
(p55) To multiply by 10/100, shift the digits one/two places to the left	MD3S3 Multiplying by 10 and 100 Using knowledge of multiplying by 10 and 100
	MD3L2 Multiplying by 10 Using place value to multiply by 10
(p57) Use known number facts and place value to carry out mentally simple multiplications and divisions	MD3S10 Multiplying multiples of 10 Using knowledge of times-table facts to multiply multiples of 10
	MD3L5 Multiplying 2-digit numbers Multiplying 2-digit numbers by splitting them into their place value components

Key to lesson and starter references

MD3S1 refers to Multiplication and Division Year 3 Starter 1

MD3L1 refers to Multiplication and Division Year 3 Lesson 1