While you are waiting, complete each of these mind gyms.

start 9	Triple it	+29	Halve it	¼ of this	X by itself	−25	÷6	x9	Answer ?

start 78	÷13	X by itself	triple it	÷9	x11	−69	3/7 of this	Double it	Answer ?

start 336	Half it	÷12	X by itself	75% of this	−56	5/7 of this	40% of this	triple it	Answer ?

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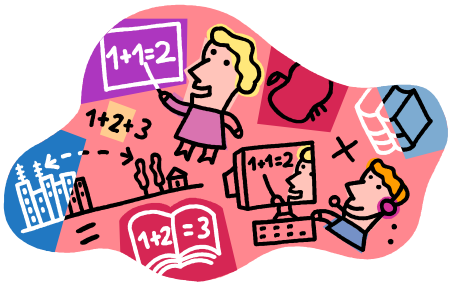

Games

Ping Pong!

You begin by setting a rhythm where one person, i.e. the adult says ping and the children reply pong. You then start to give a number in place of ping and the children have to give the complement to 10 in place of pong, so it would go something like this 'ping, pong, ping, pong, six, four, ping, pong, five, five' etc.

Children really enjoy it and can actually hear themselves getting quicker at responding.

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Expectations for Year 5 and Year 6

Taken from the National Curriculum

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Number - number and place value

- read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- round any whole number to a required degree of accuracy
- use negative numbers in context, and calculate intervals across zero
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals
- solve number problems and practical problems that involve all of the above

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Number – addition, subtraction, multiplication and division

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition and subtraction **multi-step** problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

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- multiply one-digit numbers with up to two decimal places by whole numbers
- round decimals with two decimal places to the nearest whole number and to one decimal place
- use written division methods in cases where the answer has up to two decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy
- solve problems involving number up to three decimal places
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

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Number – fractions (including decimals and percentages)

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions > 1
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$]
- divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places

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Algebra (Year 6 only)

- use simple formulae
- generate and describe linear number sequences
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with two unknowns
- enumerate possibilities of combinations of two variables.

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The Aim

- For children to do mathematics in their heads, and if the numbers are too large, to use pencil and paper to avoid losing track.
- To do this children need to learn quick and efficient methods, including mental methods and <u>appropriate</u> written methods.

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Learning written methods is not the ultimate aim.

Mathematics is foremost an activity of the mind; written calculations are an aid to that mental activity.

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Mental Methods

How can we work these out?

- 50 + 643
- 360 + 360
- 324 + 58
- 3.2 + 1.9
- 1.5 + 1.6
- 27 + 36 + 13

Did you:

- count on from the largest number?
- re-order the numbers?
- partition the numbers into 100s 10s and ones?
- bridge through 10 and multiples of 10?
- add 9, 11 etc by adding a multiple of 10 and compensating?
- use near doubles?
- use knowledge of number facts?

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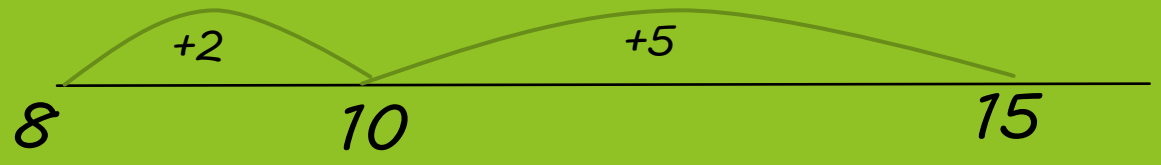
Number Facts

Children need to be able to recall other simple addition facts such as 4 + 5 and 8 + 9 and relate this to multiples of 10 and 100 (e.g. 40 + 50; 80 + 90).
These are secured through sufficient practice.

When learning to add numbers such as 8 + 7 or 26 + 7, they will learn to 'bridge through 10' to make adding quicker and more efficient. So they will make the first number add to the next 10, then add on what's left. For example,

For 8 + 7, they will do 8 + 2 = 10,
then add on the rest: + 5 = 15.



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Instant recall facts

These are a key part of home learning and an easy way for you to help your child at home.

If they know these they will find the Maths much easier.

Maths

Key Instant Recall Facts

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Year 5 - Autumn 1

I know decimal number bonds to 1 and 10.

By the end of this half term, children should know the following facts. The aim is for them to recall these facts **instantly**.

Some examples:

0.6 + 0.4 = 1	3.7 + 6.3 = 10
0.4 + 0.6 = 1	6.3 + 3.7 = 10
1 – 0.4 = 0.6	10 – 6.3 = 3.7
1– 0.6 = 0.4	10 – 3.7 = 6.3
0.75 + 0.25 = 1	4.8 + 5.2 = 10
0.25 + 0.75 = 1	5.2 + 4.8 = 10
1 – 0.25 = 0.75	10 – 5.2 = 4.8
1 – 0.75 = 0.25	10 – 4.8 = 5.2

Key Vocabulary

What do I **add** to 0.8 to make 1?

What is 1 **take away** 0.06?

What is 1.3 **less than** 10?

How many more than 9.8 is 10?

What is the **difference** between 0.92 and 10?

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Year 6 - Autumn 2

I can identify common factors of a pair of numbers.

By the end of this half term, children should know the following facts. The aim is for them to recall these facts **instantly**.

The factors of a number are all numbers which divide it with no remainder.

E.g. the factors of 24 are 1, 2, 3, 4, 6, 8, 12, and 24.
The factors of 56 are 1, 2, 4, 7, 8, 14, 28 and 56.

The common factors of two numbers are the factors they share.

E.g. the common factors of 24 and 56 are 1, 2, 4 and 8.

The greatest common factor of 24 and 56 is 8.

Key Vocabulary

factor

common factor

multiple

greatest common factor

Children should be able to explain how they know that a number is a common factor.

E.g. 8 is a common factor of 24 and 56 because $24 = 8 \times 3$ and $56 = 8 \times 7$.

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Top Tips

The secret to success is practising **little** and **often**. Use time wisely. Can you practise these KIRFs while walking to school or during a car journey? If your child is not yet confident with identifying factor pairs of a number, you may want to refer to the Year 5 Summer 2 sheet to practise this first. If you would like more ideas, please speak to your child's teacher.

There are many online games to practise finding the greatest common factor, for example: http://www.fun4thebrain.com/beyondfacts/gcfsketch.html

Choose two numbers. Take it in turns to name factors. Who can find the most?

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What's next?

- It is only once the children are confident in these mental strategies that they begin to look at more formal written methods.

- As they move through KS2, the children are taught a number of techniques, initially expanding on their mental strategies before progressing towards an efficient and more compact written method.

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Place Value

It is also crucial that children gain an understanding of place value (how much each digit in a number is worth) and how to partition a number into ones (units), tens, hundreds etc. This helps the children manage the calculation more easily.

For example: 23 + 46

Larger numbers...

can be broken down into:

20 + 40 = 60

3 + 6 = 9

60 + 9 = 69

They can then use their knowledge of place value to extend known number facts - e.g. using the fact that 3 x 6 = 18 to calculate 30 x 6 = 180.

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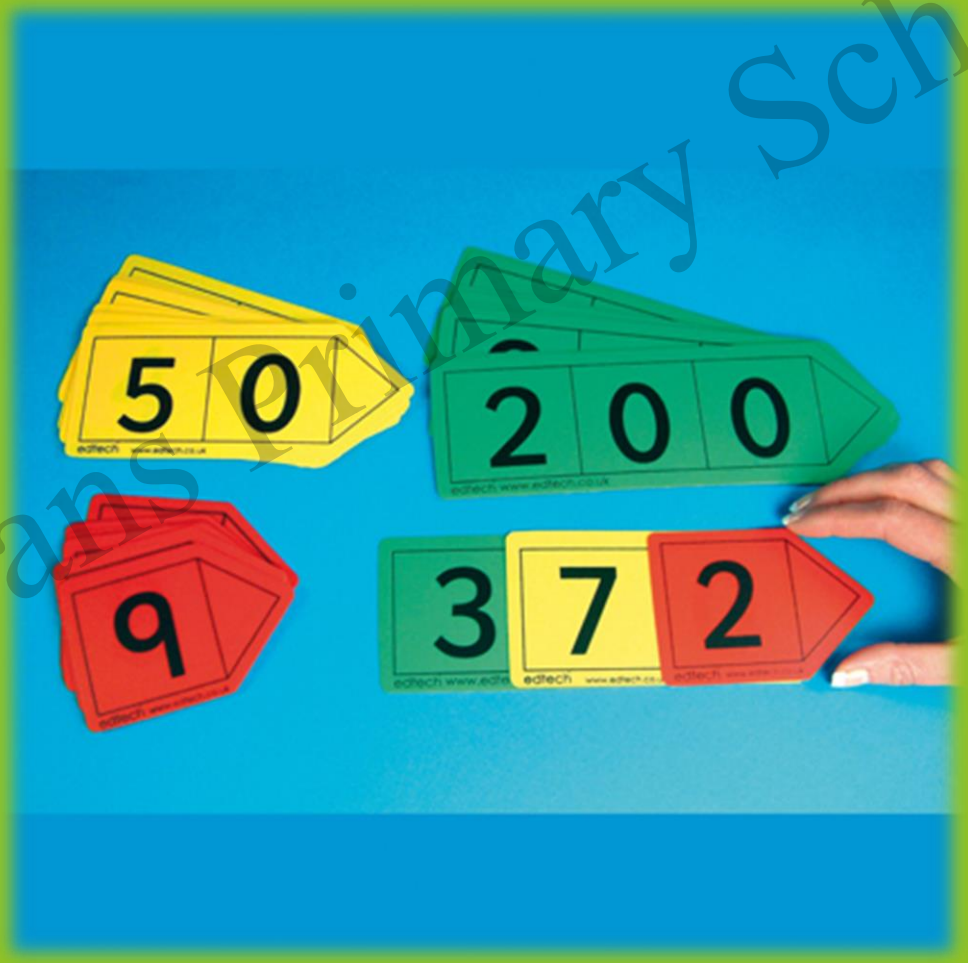
Place Value

Representations to support understanding



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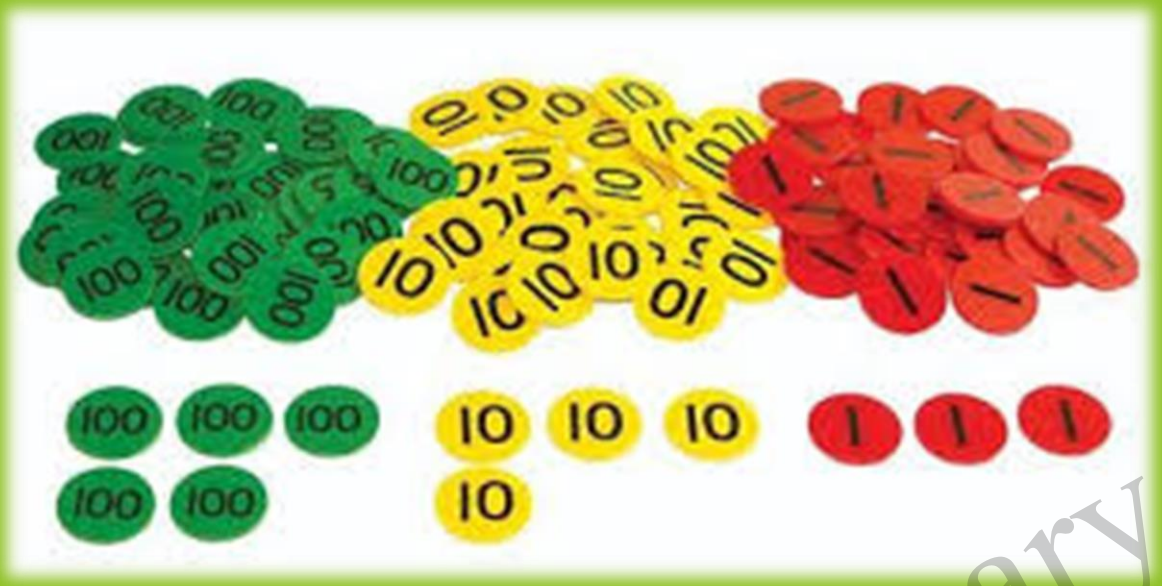

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10	1

100	10	1

1000	100	10	1

1000	100	10	1	.	10th	100th

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1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90

1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90
100	200	300	400	500	600	700	800	900

1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90
100	200	300	400	500	600	700	800	900
1 000	2 000	3 000	4 000	5 000	6 000	7 000	8 000	9 000

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Let's do some Maths!

© Mary Anne Lloyd/Laughing Stock

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Some example questions...

Counting and Place Value

Place value

(a) Which number below is **four thousand and seven**?

Put a ring round it.

47 407 4007

40007 400007

1 mark

(b) Write in figures the number **three million**.

.....

1 mark

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ADDITION

Key Words

total come increase

both altogether

sum plus combine

in all add join

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Stage 3: Column Method

Expanded

$$
\begin{array}{r}
358 \\
+\ 33 \\
\hline
11 \\
80 \\
300 \\
\hline
391
\end{array}
$$

Leading to →

Compact

$$
\begin{array}{r}
358 \\
+\ 33 \\
\hline
391 \\
{\scriptstyle 1}
\end{array}
$$

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Column Addition

- https://www.youtube.com/watch?v=6HstkNu2baI

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SUBTRACTION

Key Words

Take away

decrease

remain

difference

minus

How many more?

fewer

left

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Stage 4: Column Method

$$\begin{array}{r} 547 \\ -\ 134 \\ \hline 413 \end{array}$$

$$\begin{array}{r} {}^{3}\cancel{4}{}^{1}3 \\ 27 \\ \hline 16 \end{array}$$

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A sledgehammer to crack a nut!

$$\begin{array}{r} {\scriptstyle 0}\,{\scriptstyle 1}\,{\scriptstyle 1}\,{\scriptstyle 1} \\ 1\,0\,0\,0 \\ -\quad\;\; 7 \\ \hline 9\,9\,3 \end{array}$$

$$\begin{array}{r} {\scriptstyle 1}\,{\scriptstyle 0} \\ 16 \\ -\;9 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 97 \\ \times\;100 \\ \hline 00 \\ 000 \\ 9700 \\ \hline 9700 \end{array}$$

$$\begin{array}{r} 08 \\ 7\overline{)56} \\ {\scriptstyle 0}\;{\scriptstyle 5} \end{array}$$

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Column Subtraction

- https://www.youtube.com/watch?v=qyH6cPu23SI

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Multiplication

per

of

multiplied

product

twice

double

by

as much

times

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Stage 3: Partitioning

24 x 5

20 x 5 = 100
4 x 5 = 20

100 + 20 = 120

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Step 4: Grid Method

Multiplying TU x TU

14 x 33

	30	3
10	300	30
4	120	12

= 330 +

= 132

462

BBC News Video Link

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Use the grid method to work these out:

24 x 7

142 x 3

14 x 33

	30	3
10	300	30
4	120	12

= 330 +

= 132

462

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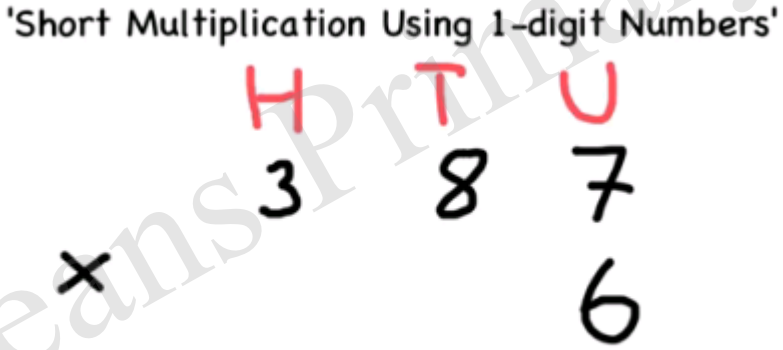
Step 5: Short multiplication

- https://www.youtube.com/watch?v=p2Fi43jZOqI



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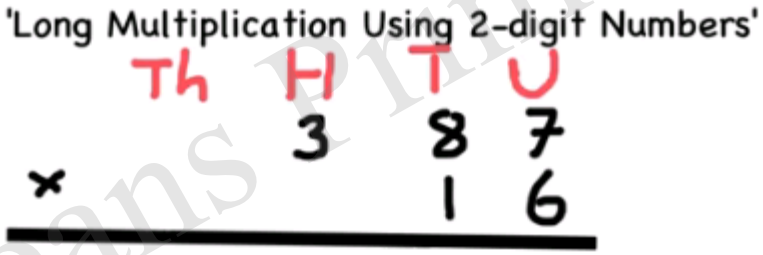
Step 5: Long multiplication

- https://www.youtube.com/watch?v=IfjTNysRgko



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Division

cut	each
evenly	Every
Quotient	out of
equal parts	divided by
In half	average

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How would you solve these?

- 123 ÷ 3
- 165 ÷ 10
- 325 ÷ 25
- 623 ÷ 24

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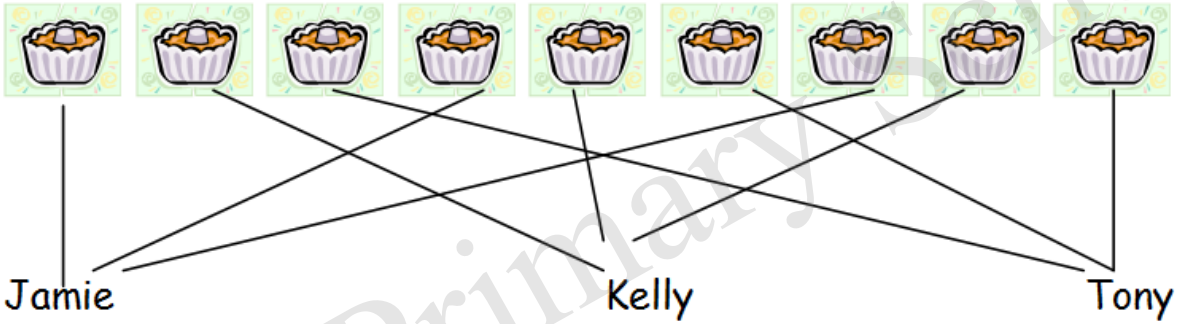
Division

Sharing

The tray had 9 cakes in and they were shared out between Jamie, Kelly and Tony. Each child had the same number of cakes. How many did they have each?



So, 9 ÷ 3 = 3

Grouping

The apples need putting into bags with 5 apples in each bag. Julie has 15 apples. How many bags will she need?

So, 15 ÷ 5 = 3

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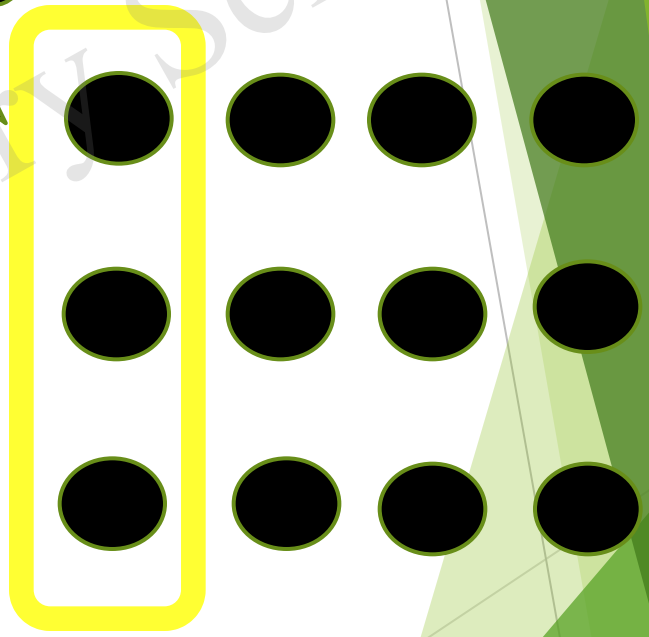
Stage 2: Arrays

First group of 3



$12 \div 3 = 4$

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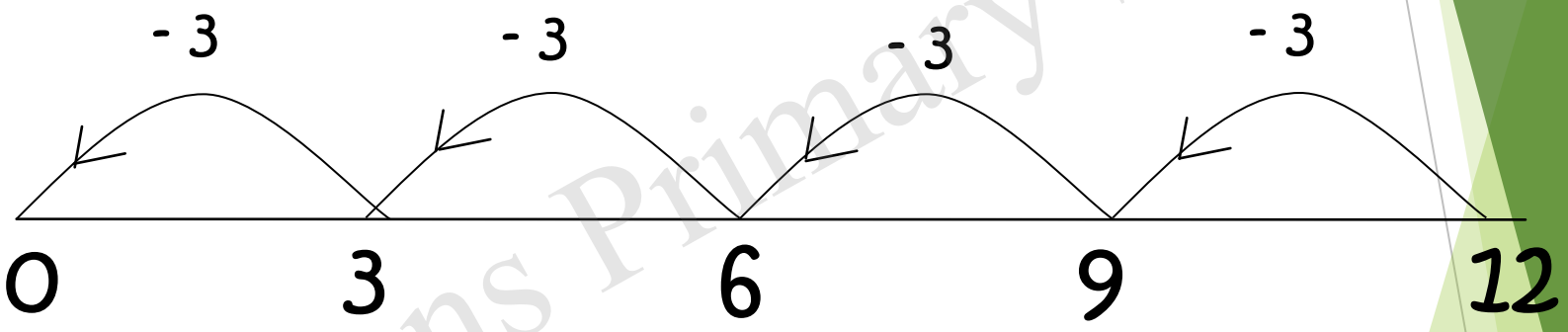
Stage 3: Repeated subtraction

12 ÷ 3 = 4



12 - 3 - 3 - 3 - 3 = 4 groups of 3.

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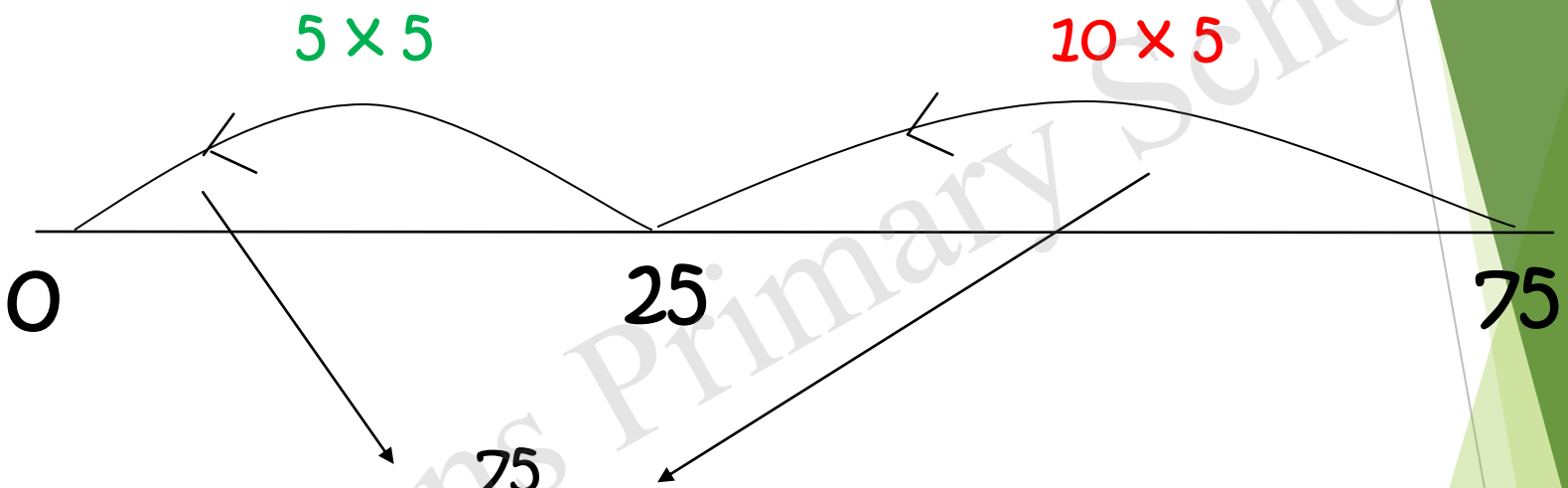
Step 4: Chunking

75 ÷ 5



75
- 50 (10 X 5)
25
- 25 (5 X 5)
0

75 ÷ 5 = 15

Need to know tables!

BBC News Video Link

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Children need to see that as the numbers get larger, large chunk subtraction is the more efficient method. Multiples of the divisor (large chunks) are taken away. Multiplication facts are needed to see the size of the 'chunk'.

What facts do I know about the 7 times-table?

100 ÷ 7 = 14 r 2

100	
- 70	(10 x 7)
30	
- 28	(4 x 7)
2	

518 ÷ 7 = 74

518	
- 350	(50 x 7)
168	
- 140	(20 x 7)
28	
- 28	(4 x 7)
0	

Fact Box

1 x 7 = 7
2 x 7 = 14
5 x 7 = 35
10 x 7 = 70
20 X 7 = 140
50 x 7 = 350
100 x 7 = 700

https://www.youtube.com/watch?v=Hs4WaZU5Cw8

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Stage 5: Short Division

For example: 84 ÷ 7 can be partitioned into (70 + 14) ÷ 7
This can now be calculated: 70 ÷ 7 = 10
14 ÷ 7 = 2 Therefore 84 ÷ 7 = 12

Another example: 104 ÷ 8 = (80 + 24) ÷ 8
80 ÷ 8 = 10
24 ÷ 8 = 3 Therefore 104 ÷ 8 = 13

Remainders may also sometimes need to be recorded:
97 ÷ 6 = (60 + 37) ÷ 6
90 ÷ 6 = 10
37 ÷ 6 = 6 r1 Therefore 97 ÷ 6 = 16 r1

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Stage 5: Short Division

The short division method can be recorded like this:

$$\begin{array}{r} 10 + 6\ \text{r}1 \\ 6\overline{)\,60 + 37} \end{array} = 16\ \text{r}1$$

$$\begin{array}{r} 16\ \text{r}1 \\ 6\overline{)\,9^{3}7} \end{array}$$

https://www.youtube.com/watch?v=Hs4WaZU5Cw8

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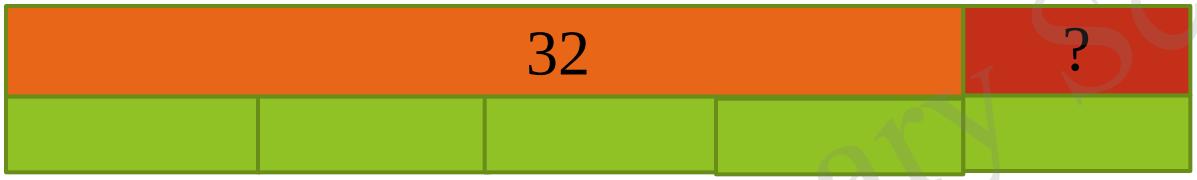
Bar Model

- Annie answered 4/5 of the questions on the test. She answered 32. How many questions were on the test?



A Super Mario Game costs £45, it is reduced in price by 25%, how much does it cost now?

=100%

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Rounding and Negative Numbers

Round the following numbers.

540 to the nearest 100 ☐

236 to the nearest 10 ☐

$1\frac{3}{4}$ to the nearest whole number ☐

2 marks

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Factors and multiples

Here is a sorting diagram with four sections, **A**, **B**, **C** and **D**.

	multiple of 10	not a multiple of 10
multiple of 20	**A**	**B**
not a multiple of 20	**C**	**D**

Write a number that could go in section **C.**

1 ma

Section **B** can never have any numbers in it.

Explain why.

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Multiply and Divide

Dev has a bag of 50p coins and Holly has a bag of 20p coins.

Dev's bag

Holly's bag

Both bags have the same amount of money in.

There are **thirty** 50p coins in Dev's bag.

How many 20p coins are there in Holly's bag?

Show your **method.** You may get a mark.

20p coins

2 marks

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Decimals and Fractions

Write in the missing numbers.

One is done for you.

$0.321 = \frac{321}{1000}$ $\qquad 2.433 = \frac{\square}{1000}$

$\square = \frac{457}{1000}$ $\qquad \square = \frac{23}{1000}$

2 marks

Calculate $\frac{3}{8}$ of **980**

Answer: $\square$

1 mark

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New 2016 SATS papers

National curriculum tests

Key stage 2

Mathematics

Paper 1: arithmetic

First name						
Middle name						
Last name						
Date of birth	Day		Month		Year	
School name						

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Arithmetic Paper

- The arithmetic paper accounts for over one-third of the marks available, replacing the emphasis on mental arithmetic from the old Key Stage 2 tests.
- These test papers focus on questions relating to the number, calculations and fractions strands of the new National Curriculum. Each question is presented as a context-free calculation using only digits and symbols. No equipment other than pen, pencil, ruler and rubber are permitted for this test.

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Arithmetic Paper Continued

- The paper is designed to assess the range of mathematical operations. There are around 35-38 questions, with most worth 1 mark. Several of the early questions invite pupils to use mental strategies (such as 979 + 100, or 6·1 + 0·3).
- Children will have 30 minutes to complete the paper.
- Throughout the paper, challenge is increased with the introduction of larger numbers, or increasing numbers of decimal places, and the introduction of more complex fraction calculations.
- Questions requiring long multiplication or division are worth 2 marks, with 1 mark being available for the use of a standard method with only one calculation error. These questions are presented using the standard column or 'bus stop' layouts to guide pupils to use these forms.
- All questions are presented with a 7mm squared grid working area for children to use if they wish.

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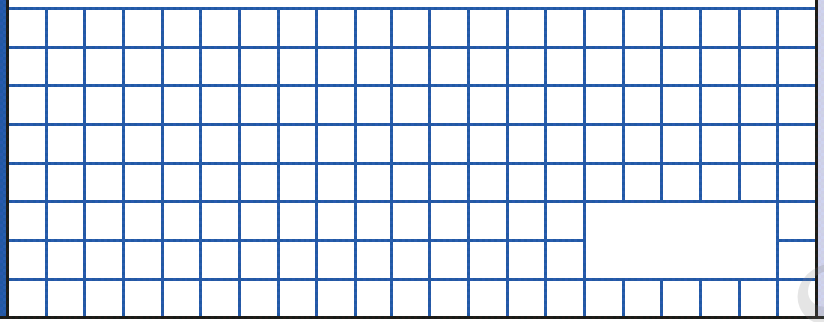
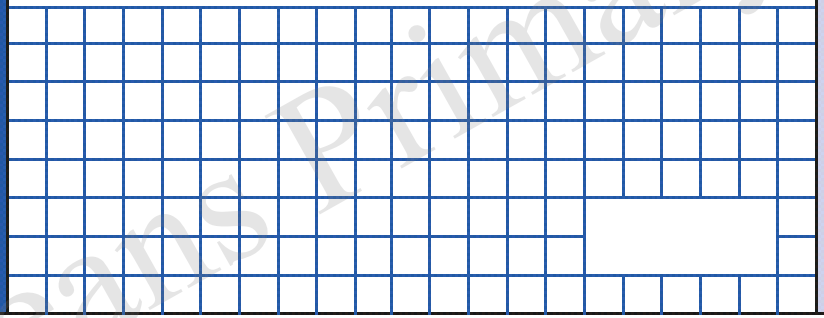
1 979 + 100 =



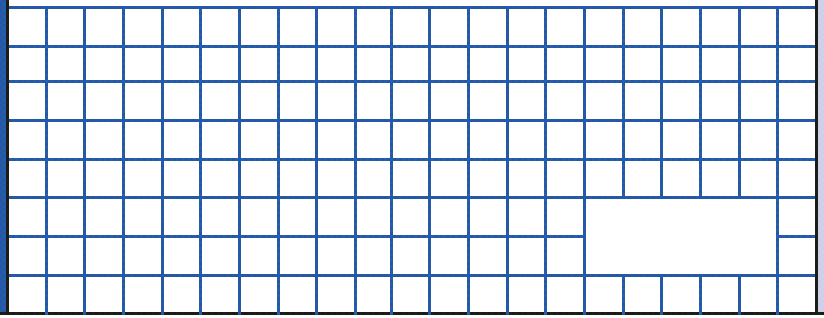
1 mark

2 123 × 2 =



1 mark

3 6.1 + 0.3 =



1 mark

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Have a go!

On your table is an arithmetic test for Year 5 and Year 6...work as a team to see how many questions you can answer is 3 minutes!

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The Mathematical Reasoning Papers

- Tests include papers which require children to demonstrate their use of mathematical fluency to solve problems both in and out of context. These papers draw on the full spectrum of the new National Curriculum programmes of study for mathematics, although there remains a focus on the number elements.

- There's a good deal of work to be done in the coming year for pupils in Year 6 to ensure that they are well prepared for the tests. Here are some of our tips for helping your child:
- **Top Tips**
- ✔✔ Ensure that children are confident with the relevant addition bonds and multiplication tables.
- ✔✔ Practise written methods of calculation regularly to ensure that children can use them quickly and confidently.
- ✔✔ Continue mental maths practice: many of the skills taught for the old mental maths paper are great
- for practising fluency and recall for all sorts of questions and tasks.

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MATHS WEBSITES

www.whiz.com

www.ictgames.com

www.bbc.co.uk/schools

www.crickweb.co.uk

www.counton.org

www.mathzone.co.uk

www.nrich.maths.org

www.mathsplayground.com

www.lancsngfl.ac.uk

www.childparenting.about.com

www.mad4maths.com

www.maths-games.org

www.topmarks.co.uk

www.mathletics.co.uk

www.themathsfactor.com

www.mathsformumsanddads.co.uk

Thank you!

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	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Square numbers Double 3s for 6s Double 4s for 8s Double 6s for 12s

九九乘法口诀表

乘宝宝系列丛书

1

1×1=1
1×2=2
1×3=3
1×4=4
1×5=5
1×6=6
1×7=7
1×8=8
1×9=9

2

2×2= 4
2×3= 6
2×4= 8
2×5=10
2×6=12
2×7=14
2×8=16
2×9=18

3

3×3= 9
3×4=12
3×5=15
3×6=18
3×7=21
3×8=24
3×9=27

4

4×4=16
4×5=20
4×6=24
4×7=28
4×8=32
4×9=36

5

5×5=25
5×6=30
5×7=35
5×8=40
5×9=45

6

6×6=36
6×7=42
6×8=48
6×9=54

7

7×7=49
7×8=56
7×9=63

8

8×8=64
8×9=72

9

9×9=81

Orleans Primary School