

Calculations Policy

The Beeches Primary School



Author:	Emma McFarland
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Maths No Problem



Aims of the National Curriculum 2014

The national curriculum for mathematics aims to ensure that all pupils:

Become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.

Can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Curriculum Coverage

FLUENCY – Being able to recall facts and solve calculations with speed. This also relates to solving simple word problems.

REASONING – Being able to explain the steps in a process, how an answer was found, or explaining mistakes or misconceptions in a process.

PROBLEM SOLVING – Children are able to solve complex problems that require recall of facts, reasoning, and logical thinking. Children are also required to think about representing questions in different ways to help solve a problem.

Why Maths - No Problem?

Children will have a greater conceptual understanding of number and calculation. They will be able to visualise and generalise more readily due to a more in-depth understanding

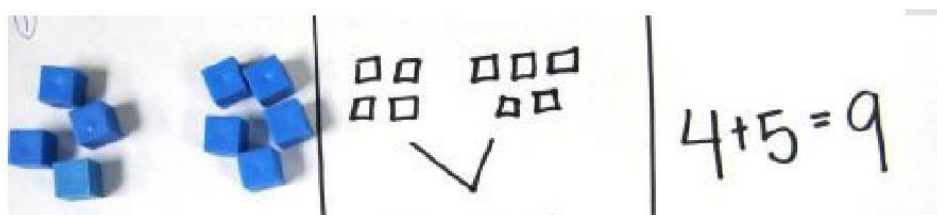
All children will be fully supported through accessing concrete equipment and use of visual models to support understanding.

Rapid graspers will be challenged through exposure to unfamiliar problems, development of reasoning skills and by exploring multiple ways to manipulate numbers and solve problems.

All learners will access teaching of content which matches the expectations of the curriculum in England and be supported further, if needed. The resources match the expectations for formal written methods set out by the government, alongside greater understanding in order to reach 'mastery'.

CPA Approach

Concrete, pictorial, abstract (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of maths. The CPA approach is the mainstay of maths teaching in Singapore.



Types of Understanding

Instrumental Understanding

"Instrumental understanding" can be thought of as knowing the rules and procedures without understanding why those rules or procedures work. Students who have been taught instrumentally can perform calculations, apply procedures... but do not necessarily understand the mathematics behind the rules or procedures.

Relational Understanding

"Relational understanding", on the other hand, can be thought of as understanding how and why the rules and procedures work. Students who are taught relationally are more likely to remember the procedures because they have truly understood why they work, they are more likely to retain their understanding longer, more likely to connect new learning with previous learning, and they are less likely to make careless mistakes.

(Richard Skemp)

What is Maths – No Problem?

Maths — No Problem! is a series of textbooks and workbooks written to meet the requirements of the 2014 English national curriculum.

The MNP Primary Series was assessed by the DfE's expert panel, which judged that it met the core criteria for a high-quality textbook to support teaching for mastery.

As a result, the MNP Primary Series are recommended textbooks for schools on the mastery programme.

Singapore Approach to Mathematics

Singapore established a new way of teaching maths following their poor performance in international league tables in the early 1980's.

Based on recommendations from notable experts, Singapore maths is a combination of global ideas delivered as a highly-effective programme of teaching maths.

The effectiveness of this approach is demonstrated by Singapore's position at the top of the international benchmarking studies and explains why their programme is now used in over 40 countries including the United Kingdom and the United States.

Singapore has become a “laboratory of maths teaching” by incorporating established international research into a highly effective teaching approach. With its emphasis on teaching pupils to solve problems, Singapore Maths teaching is the envy of the world.

Based on recommendations from notable experts such as Jerome Bruner, Richard Skemp, Jean Piaget, Lev Vygotsky, and Zoltan Deines, Singapore maths is an amalgamation of global ideas delivered as a highly-effective programme of teaching methods and resources.

One of highest performing countries in terms of maths.

Teach the concepts of mathematics.



Problem solving is at the heart of mathematics and should be the focus of what is taught in schools.

The focus is not on rote procedures, rote memorisation or tedious calculation but on relational understanding.

Pupils learn to think mathematically as opposed to reciting formulas they don't understand.

Is a way of teaching that allows students to develop a greater sense of number and how to use and manipulate numbers to solve a variety of problems.

A highly effective approach to teaching maths based on research and evidence.

Pupils are encouraged to solve problems working with their core competencies, in particular:

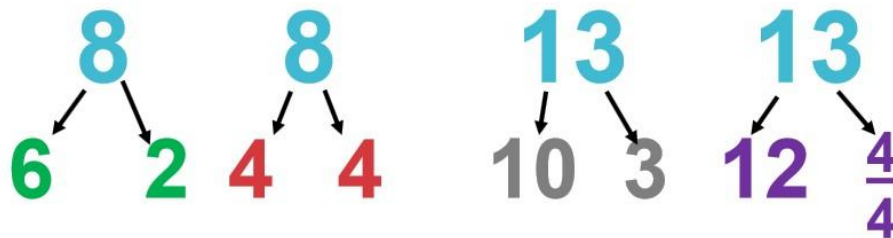
Visualisation

Generalisation

Make decisions

Number Sense

Number sense is knowing what numbers mean by themselves and in relation to one another, the ability to partition (break apart numbers) into a variety of ways, and being able to manipulate numbers for different purposes.



What is Mastery?

What does it mean to master something?



I know how to do it...



I don't even need to think about it...



I'm really good at doing it...



I can show someone else how to do it...



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Mastery of Mathematics

Achievable for all.

Deep and sustainable learning.

The ability to build on something that has already been sufficiently mastered.

The ability to reason about a concept and make connections.

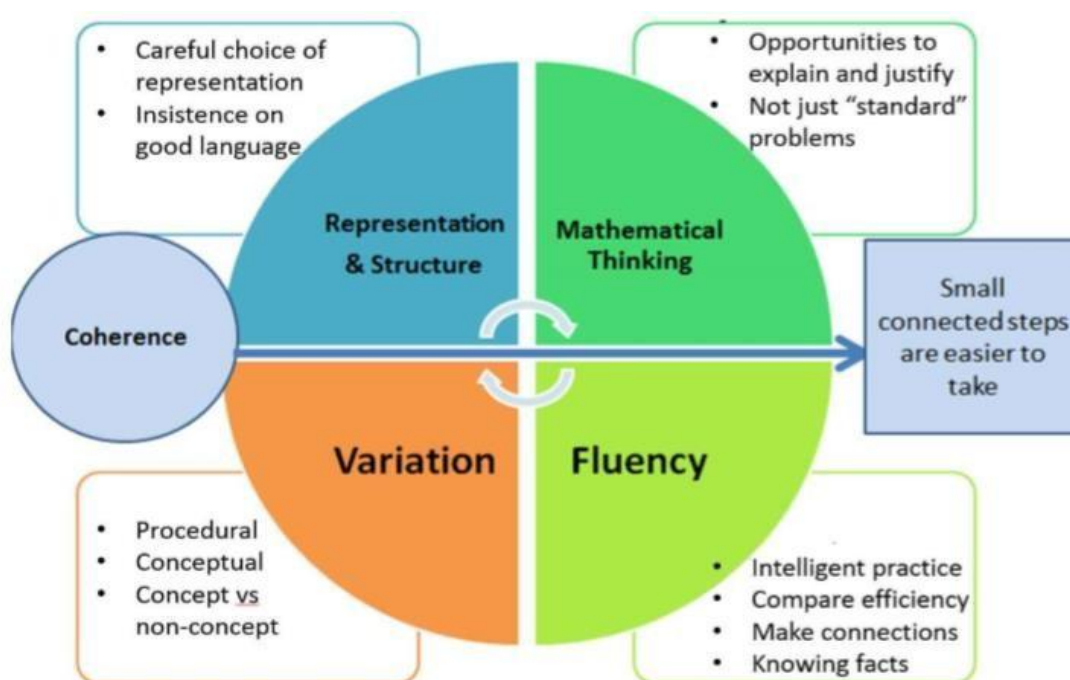
Conceptual and procedural fluency.

Involves a longer time spent on key topics, providing time to go deeper and embed learning.

Procedure has to be backed up by understanding

Five Big Ideas

Lesson Design for Teaching for Mastery



Mastery

Involves a development of three forms of knowledge:

Factual – I know that.

Procedural – I know how.

Conceptual – I know why.

We are aiming to provide children with opportunities to develop:

Deep and sustainable understanding of mathematical concepts.

Ability to reason about mathematics and make connections.

Facts and efficient procedures – the mathematical ‘tool kit’.

Confidence and competence in using mathematics to solve problems.

Structure of Maths – No Problem!

Concepts merge from one chapter to the next e.g.

Chapter 1 – Place Value

Chapter 2 – Addition and Subtraction

Each chapter has a series of lessons to follow.

Children master topics before moving on.

How lessons are taught

The parts to the lesson are:

There are five main stages of a Maths — No Problem! Lesson. These components are exploration, structured discussion, practice, journalling and reading. There is no right or wrong order to these components and the lesson structure can vary from teacher to teacher. Before we move on to the individual parts of a lesson, it is important to note that we do not necessarily have to include all five components in every lesson for the learning to be well-rounded and complete.

Exploration The teacher will present the whole class with a problem to explore. We call this the **Explore** task, it will be the central focus of the whole lesson, and it can be found in the Explore section of the textbooks. The anchor tasks have been designed to motivate learning for the whole class. During this part of the lesson, learners will be working in groups exploring the task themselves, however they see fit, whether this is with concrete resources, modelling or different strategies etc. After teachers have presented the problem and set a time for exploration, their role is observation and assessment. They are giving their class independence to experiment.

Structured discussion If you are following Zoltan Dienes’ theory, then structured discussion would come after exploration in the lesson order. This part of the lesson is a teacher-led whole class discussion. The aim is to use targeted questions to draw out from the group, different methods to discuss, and any misconceptions to rectify. The Master section of the book can provide some anticipated methods for solving the problem and teachers can use this to guide the discussion.

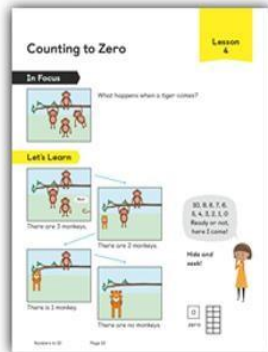
The questioning will be based on: 'What are you doing in this strategy to solve the problem and why are you doing it?' Practice In the Maths — No Problem! programme there are two types of practice: guided and independent.

Guided Practice can be found in the textbook, where learners can work through the questions in pairs, whereas Independent Practice can be found in the workbook and as the name suggests pupils work through these by themselves. Both sets of questions have been designed with variation in mind, so learners can develop a deeper understanding of the topic as they work through the exercises. During both types of practice, the teacher will be observing. If they notice a common misconception throughout the class, they could choose to close this section of the lesson with a plenary to immediately address it. Additionally, in each chapter you will find various Activity Times which have been included to help learners explore mathematical concepts further. And there is a Mind Challenge at the end of each chapter to encourage pupils to work on their greater depth thinking.

Journalling The aim of journalling is to give learners a question or task based on the lesson's problem, so it could be creating a story for an equation, taking a Guided Practice question and explaining the calculation, picking one method for solving a problem and justifying why it is the most effective, etc. It allows learners to explore new ideas and to create a completely personal journal entry, making it easier for teachers to assess which individuals have truly grasped the concept and who in the class is working at a greater depth. It also gives learners an opportunity to develop their communication skills by learning to articulate their ideas and explicate their mathematical thinking that surfaced during exploration.

There are five types of journalling — descriptive, evaluative, creative, investigative and formative — and it is important to try and utilise all of them throughout the school year. For some inspiration you can find a Maths Journal idea at the end of each chapter. Reading At some point in the lesson, the learners should be given an opportunity to read through the corresponding content in the textbook. The Maths — No Problem! textbook can be thought of as our friend's journal, with the aim being that pupils can validate their exploration and the class discussion by comparing methods. It is a time for learners to reflect upon which methods they think are the most effective and why. Additionally, it is a good opportunity to learn clear and concise ways to articulate their ideas when writing their own journals.

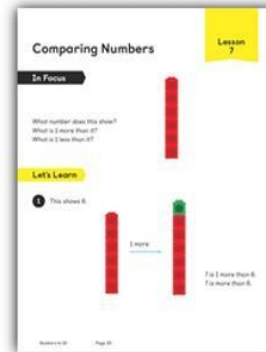
- 1 Each lesson leads onto a new level of understanding of a concept. The entire system allows pupils to master ideas before moving. Children then revisit concepts as they progress through the spiral curriculum
- 2 Questions and example are varied both systematically and mathematically to bring pupils to a new level of understanding each time.



Introduce zero



Ordering numbers



Comparing numbers

Exploratory Task

Add three numbers

Add three numbers

In focus



Can you add to find out how many flowers there are in total?

Guided practice

- 1 Make 10 and add.

(a) $2 + 8 + 4 = \square + \square$
 $= \square$

(b) $3 + 9 + 1 = \square + \square$
 $= \square$

- 2 Add.

(a) $6 + 7 + 4 = \square$

(b) $9 + 0 + 4 = \square$

(c) $8 + 5 + 9 = \square$

(d) $7 + 9 + 6 = \square$

Textbooks

Ideas are developed systematically using learning theories and research as a basis, in particular, the work of Jerome Bruner (representations and spiral curriculum) and Zoltan Dienes (Informal-structured-practice progression as well as systematic and mathematical variation of examples)

Workbooks

Allow children to show their understanding of a concept by solving problems displayed in different ways.

The questions are set up to ensure children understand the concept forwards, backwards and inside out.

For rapid graspers this consolidates any previous learning before they move onto greater depth challenges.

Children can work at their own pace through the questions.

Maths journals

Exploratory task

Guided practice

Challenges

5 types of journalling



How will children be challenged?

Make links between previous learning.

Think about problems in different ways.

Have opportunities to explain their reasoning.

Find and explain generalisations.

Use rich mathematical language when explaining ideas.

Solve complex problems which expand on their mathematical knowledge.

Work with a range of manipulatives to consolidate their understanding.

Work with a mix of children in groups, pairs and independently.

Challenge

Problem solving/ reasoning challenges

Explain using drawing/ equipment

Explain orally/ through writing

Write their own problem

Invent a method/ game

Create their own question

Make connections

Identify rules/ generalisations

Correct a mistake

Odd one out

Find something new

How are children supported?

Make links between previous learning.

Think about the way they know to solve problems.

Have opportunities to listen to mathematical vocabulary from peers and use themselves.

Be given more time to work on tricky concepts.

Work with a range of manipulatives to solve problems practically.

Work with a range of children in groups, pairs and independently.

Scaffold learning- extra clues and support.

Scripts to support pupils that may struggle to understand a concept due to cognitive overload.

How teachers support all learners

Move individual children on at their own pace throughout the lesson.



Set rich and sophisticated problem solving activities for rapid graspers.

Give time for all children to fully grasp and master concepts.

Provide visual stimuli for children to access a problem using CPA approach.

Give children ownership in their learning.

Model making mistakes- maths is challenging.

“Negative ideas that prevail about maths... come from one idea, which is very strong, permeates many societies and is at the root of maths failure and underachievement: that only some people can be good at maths. The single belief – that maths is a ‘gift’ that some people have and others don’t – is responsible for much of the widespread maths failure in the world.”

Jo Boaler

Mathematical Mindset (2016)

Maths is challenging. Children need to expect to struggle - this is part of learning

EYFS Mathematics Policy

EYFS are using White Rose Maths as they found this to align better with the Early Learning Goals.

Reception age children learn best when learning is practical, repetitive and revisited frequently.

The Reception maths scheme covers the DFE statutory framework for the EYFS and Educational Programme for Mathematics and introduces counting, number patterns and simple number problems in a natural, supportive way.

The scheme uses a range of familiar manipulatives to explore number beginning with 1,2,3 and building to 10 and beyond. The same manipulatives are used throughout to learn about addition, subtraction, sharing and doubling.

By doing so, we give Reception age children the confidence to develop crucial skills and knowledge.

- Reception age children are supported to explore patterns, sorting, matching, counting, matching to number, ordering numbers, shape, position, sequencing and the development of oracy and reasoning in readiness for Year 1.
- Children are supported to grow in independence and feel successful in maths by fostering a love of mathematical learning through the classroom environment, lessons, and outdoor provision.

One to One Correspondence: Children first learn to count using one to one correspondence. Children will be encouraged to say a number each time they touch an object.



Using Physical
by practically taking
more. They will also
to support them.



Resources: Children begin
away one or adding one
be able to use drawings

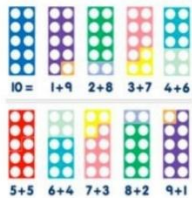
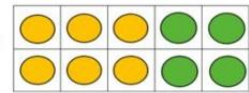
Numicon: Children will be able to use Numicon to count, as well as ordering them from smallest to biggest to create their own number line. Children should be able to see which Numicon shape is one more or one less.



Recognising Numerals: Children learn to recognise numerals to 20. They are beginning to match the numeral with the correct corresponding quantity.

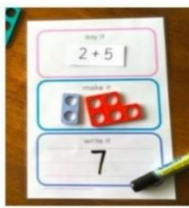
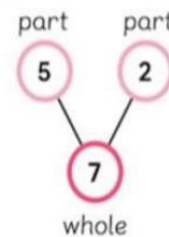
Number Bonds using Tens Frame: Children will be able to use a tens frame to find number bonds to 10.

Tens frame:



Number Bonds using Numicon: Children will be able to use Numicon to find number bonds to 10.

Part-Part- Whole Model: Children will use the part-part-whole diagram to add and subtract numbers.



Alongside the part-part-whole diagram, children will use Numicon and practical resources to add and subtract numbers. Children will be confident to say and write calculations using the + and – signs.

Number Lines: Children will be able to use a number line to count as well as using it to take away or add one. This will be for numbers up to 20.



What does the National Curriculum say?

Key stage 1 - Years 1 and 2

- The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the 4 operations, including with practical resources.
- At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities.
- By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value.
- Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower KS2

- The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the 4 operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.
- Pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value.
- Pupils are encouraged to draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.
- By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12-multiplication table and show precision and fluency in their work.
- Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling

Upper KS2

- The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.
- Pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems.
- Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

- By the end of year 6, pupils should be fluent in written methods for all 4 operations, including long multiplication and division, and in working with fractions, decimals and percentages.
- Pupils should read, spell and pronounce mathematical vocabulary correctly.

Year 1 Mathematics Policy

Place Value – Counting

Counting to 10:



We can count on:



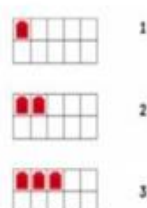
We can count back:



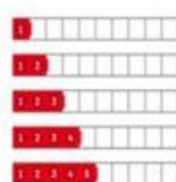
We count with objects:



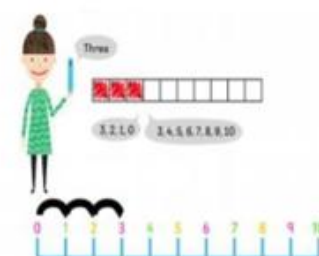
Physical objects



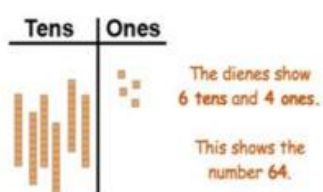
Tens square



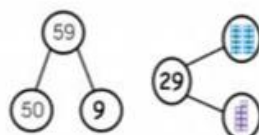
Multilink cubes



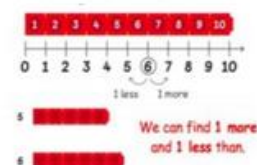
Number lines



Dienes to represent numbers



Number bond method



Ordering numbers

There are 3 cupcakes.

There are 5 cookies.

There are 7 doughnuts.

Which number is more than the others?
Which number is less than the others?

7 is more than 5.
7 is more than 3.
7 is the greatest.

3 is less than 7.
3 is less than 5.
3 is the smallest.

Comparing numbers

1
one

2
two

3
three

Writing numbers to 10

Addition

How many eggs are there in total?

$2 + 5 = 7$

Number line method

$7 = 5 + \square$

Abstract calculations

(a)

$\square + \square = \square$

(b)

$\square + \square = \square$

(c)

$\square + \square = \square$

Pictorial method

Put 5 cupcakes on two plates.

whole 5

part 2

part 3

2 and 3 make 5.

This is a number bond.

Number bond method

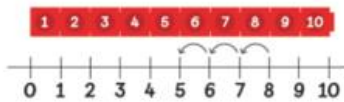
Subtraction



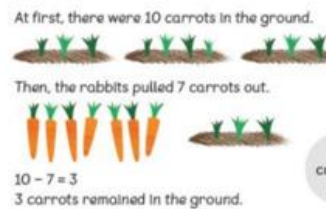
Subtract by crossing out



Subtract by number bonds

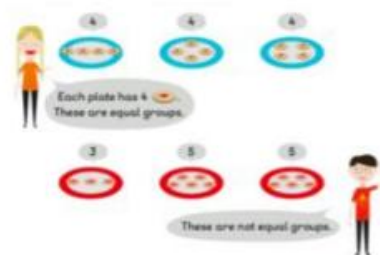


Subtract by counting back

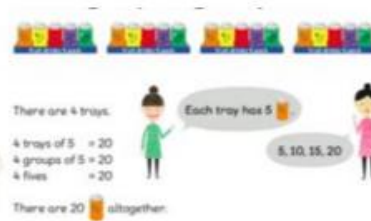


Subtract by writing stories

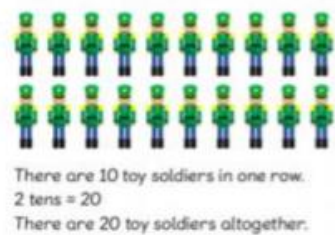
Multiplication



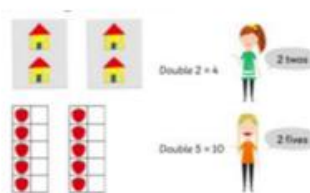
Making equal groups



Adding equal groups



Making equal rows



Making Double

Division

There are 8 cans.



There are 4 boxes of 2 cans.

Grouping equally

There are 6 cookies and 3 children.
Each child takes one cookie.



Each child takes one more cookie.



Each child gets 2 cookies.

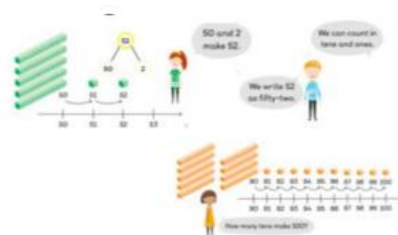
Sharing equally

Year 2 Mathematics Policy

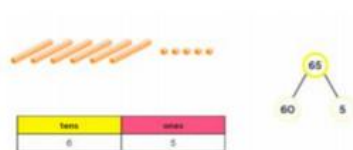
Place Value



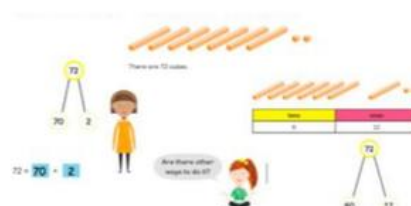
Counting in tens to 100



Counting in tens and ones



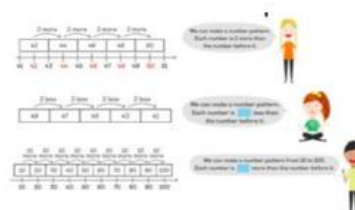
Represent two-digit numbers



Make numbers using different number bonds



Comparing numbers



Extend number patterns



Find the missing numbers in patterns

Addition



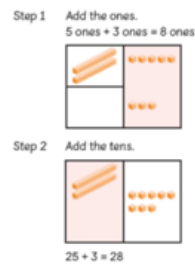
Number line method



Pictorial method



Partitioning method



Deines method

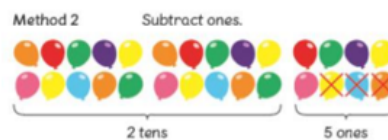


Column method

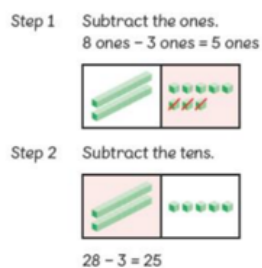
Subtraction



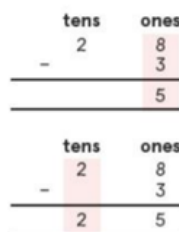
Number line method



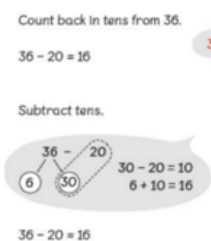
Pictorial method



Deines method



Column method



Partitioning method

Multiplication

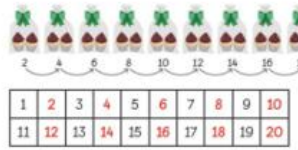
$$3 + 3 + 3 + 3 = 12$$

$$4 \text{ threes} = 12$$

$$4 \text{ groups of } 3 = 12$$

$$4 \times 3 = 12$$

Repeated addition



Pictorial to abstract



How many cupcakes are there altogether?

Grouping method

Multiply.

(a) $2 \times 5 =$

$3 \times 5 =$

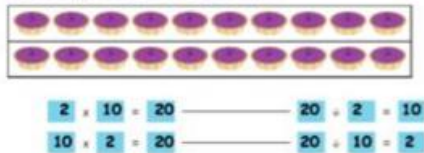
(b) $4 \times 5 =$

$5 \times 5 =$

Abstract method

Division

Look at the picture.
Make a family of multiplication and division facts.



Make a family of multiplication and division facts

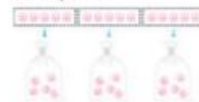
Ruby has 15 marshmallows.
She packs 5 marshmallows into each bag.
How many bags does Ruby need?

Method 1 Use  to stand for .
Use  for each bag.



Method 2 Draw a picture.

Ruby has 15 marshmallows.
She packs 5 marshmallows into each bag.
How many bags does Ruby need?



Ruby has 15 marshmallows.
She packs 5 marshmallows into each bag.
How many bags does Ruby need?

Method 3 Use a division equation.

$$15 \div 5 = 3$$

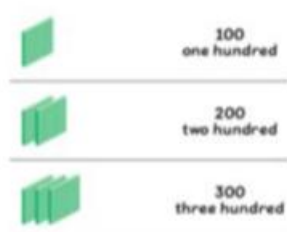
Ruby needs **3** bags.

Solving problems

Year 3 Mathematics Policy

Place Value

Re-capping methods taught in Year 1 and Year 2.



What is the value of each digit in 530?

hundreds	tens	ones
5	3	0

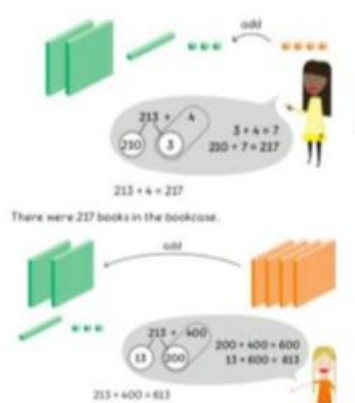
530 = hundreds + tens + ones

530 = + +

The value of the digit 5 is 500.
The value of the digit 3 is 30.
The value of the digit 0 is 0.



Numbers to 1000



Adding ones, tens and hundreds

Addition- No renaming



Beginning practically with dienes before moving onto column addition. Number bond method is taught alongside both methods.

Addition- With renaming

1 (a) $153 + 2 =$

(b) $153 + 20 =$

(c) $153 + 200 =$

2 (a) $214 + 3 =$

(b) $214 + 30 =$

(c) $214 + 300 =$

3 (a) $325 + 14 =$

	h	t	o
	3	2	5
+		1	4

(b) $236 + 543 =$

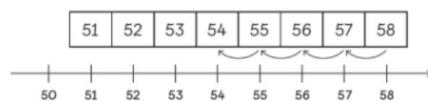
	h	t	o
	2	3	6
+	5	4	3

Expected to solve a larger number of abstract calculations. Secure understanding of place value to 1000.

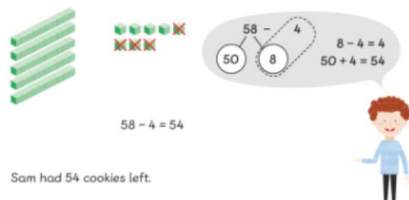
Secure understanding of place value to 1000.

Subtraction

Method 1 Count back from 58.



Method 2 Subtract ones.

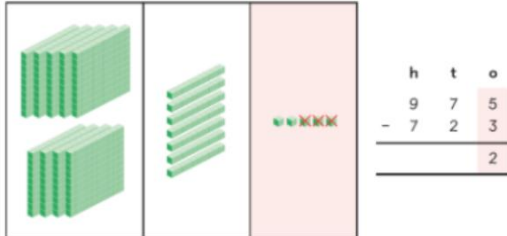


Subtraction numbers within 1000

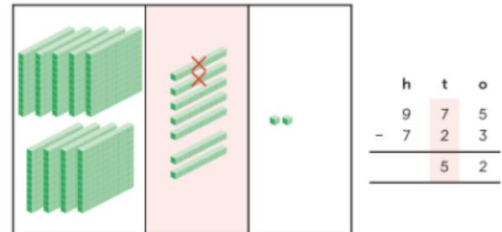
Subtraction- no regrouping- Beginning practically with dienes before moving onto column subtraction. Number bond method is taught alongside both methods.

Subtract 723 from 975.

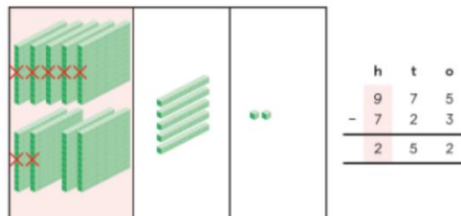
Step 1 Subtract the ones.
5 ones - 3 ones = 2 ones



Step 2 Subtract the tens.
7 tens - 2 tens = 5 tens



Step 3 Subtract the hundreds.
9 hundreds - 7 hundreds = 2 hundreds



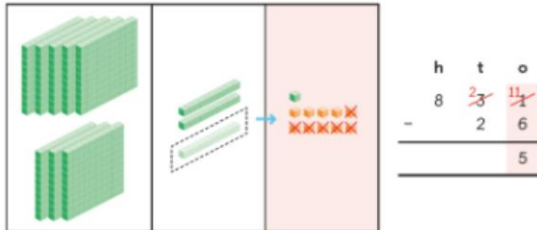
$$975 - 723 = 252$$

There were 252 beads left in the jar.

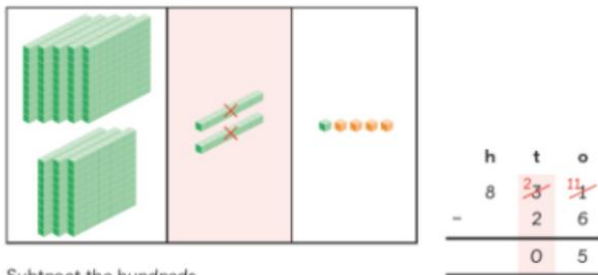
Subtraction- with regrouping

Subtract 26 from 831.

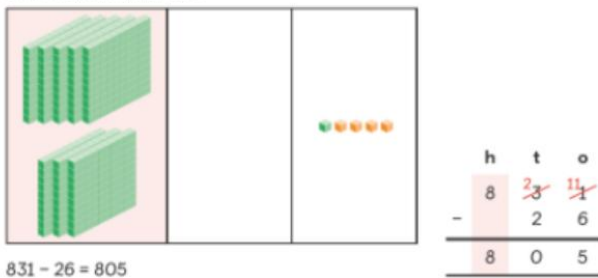
Step 1 Regroup 1 ten into 10 ones.
Subtract the ones.
11 ones - 6 ones = 5 ones



Step 2 Subtract the tens.
2 tens - 2 tens = 0 tens



Step 3 Subtract the hundreds.



$$831 - 26 = 805$$

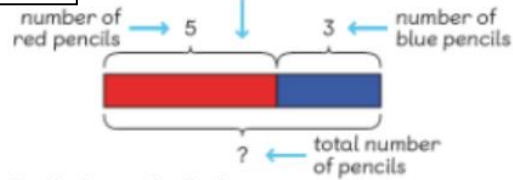
Beginning practically with Dienes before moving onto column subtraction. Number bond method is taught alongside both methods.

Bar Model Method

Use   to show the number of pencils.

Concrete

Pictorial



$$5 + 3 = 8 \text{ or } 3 + 5 = 8$$

There are 8 pencils altogether.

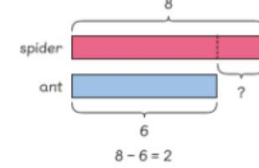
Abstract

Draw bars to show each number.



How many more legs does a spider have than an ant?

A spider has 8 legs.
An ant has 6 legs.



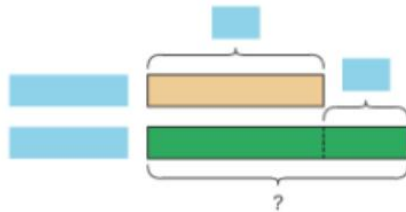
$8 - 6 = 2$
A spider has 2 more legs than an ant.

Draw bars to show each number.



Applying addition and subtraction skills to word problems with bar models to assist.

Lulu has 205 beads.
Holly has 40 more beads than Lulu.
How many beads does Holly have?



$$\text{blue bar} + \text{green bar} = \text{total bar}$$

Holly has  beads.

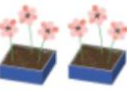


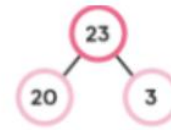
Who has more beads?

Should we add or subtract?



Multiplication

	1 group of 3 $1 \times 3 = 3$
	2 groups of 3 $2 \times 3 = 6$
	3 groups of 3 $3 \times 3 = 9$



Step 1 Multiply the ones by 2.

$$3 \text{ ones} \times 2 = 6 \text{ ones}$$

Step 2 Multiply the tens by 2.

$$2 \text{ tens} \times 2 = 4 \text{ tens}$$

Step 3 Add the products.

$$6 + 40 = 46$$

$$23 \times 2 = 46$$

	t	o
	2	3
x		4
	1	2
+	8	0
	9	2

Step 2

	h	t	o
		2	3
x			8
	1	8	4

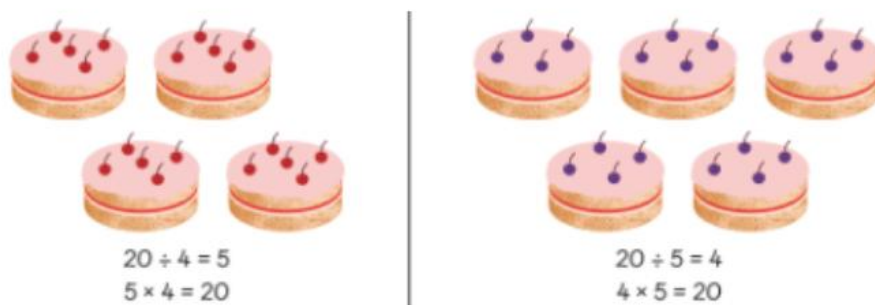
$$23 \times 8 = 184$$

The product of 23 and 8 is 184.

2 tens $\times$ 8 = 16 tens
16 tens + 2 tens = 18 tens



Division



We can make a family of multiplication and division equations.

In Focus

I have 8 coins.

I have twice as many coins as you.

How many coins does have?

Let's Learn

1

Method 1 $8 + 8 = 16$

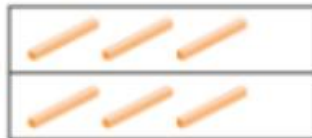
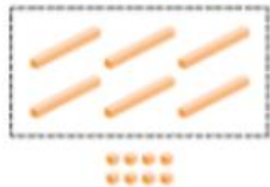
Method 2 $2 \times 8 = 16$

has 16 coins.

To find the number of sweets each person gets, divide 68 by 2.

$$68 \div 2 = \square$$

Step 1 Divide 6 tens by 2.

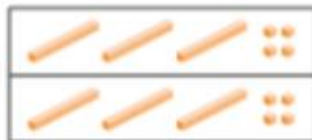


6 tens $\div$ 2
= 3 tens

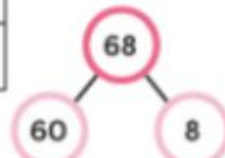


Number Bond
Method

Step 2 Divide 8 ones by 2.



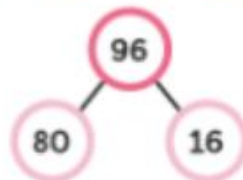
8 ones $\div$ 2
= 4 ones



Step 3 Add the results.

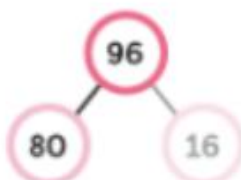
$$68 \div 2 = 30 + 4 = 34$$

Each person gets 34 sweets.



First, I take 80 from 96.
Then, I take 16 from the remaining 16.

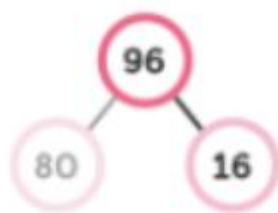
$$\begin{array}{r} 12 \\ 8 \overline{) 96} \\ \underline{- 80} \\ 16 \\ \underline{- 16} \\ 0 \end{array}$$



$$\begin{array}{r} 12 \\ 8 \overline{) 96} \\ \underline{- 80} \\ 16 \\ \underline{- 16} \\ 0 \end{array}$$

$$8 \text{ tens} \div 8 = 1 \text{ ten}$$

Long Division
Method



$$\begin{array}{r}
 12 \\
 8 \overline{) 96} \\
 \underline{- 80} \\
 16 \\
 \underline{- 16} \\
 0
 \end{array}$$

2 ones

$$16 \text{ ones} \div 8 = 2 \text{ ones}$$

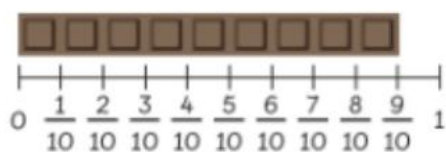
$$1 \text{ ten} + 2 \text{ ones} = 12$$

$$96 \div 8 = 12$$

$$\begin{array}{r}
 12 \\
 8 \overline{) 96} \\
 \underline{- 80} \\
 16 \\
 \underline{- 16} \\
 0
 \end{array}$$

Move onto problem solving involving these methods and bar models

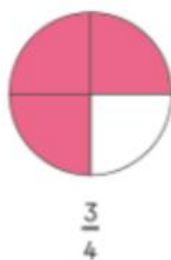
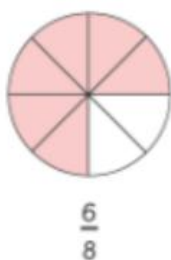
Fractions



9 tenths



Tenths



$\frac{6}{8}$ is equal to $\frac{3}{4}$.

$$\frac{6}{8} = \frac{3}{4}$$

They are equivalent fractions.

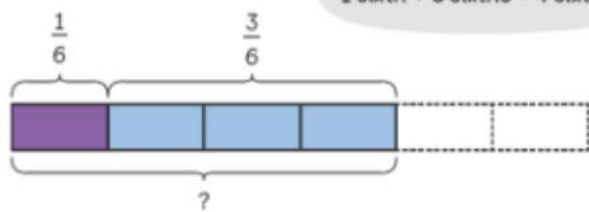
$\frac{3}{4}$ is the simplest form of $\frac{6}{8}$.

Amira is correct.



Finding equivalent and simplifying fractions.

Add $\frac{1}{6}$ and $\frac{3}{6}$.



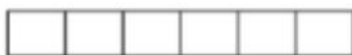
1 sixth + 3 sixths = 4 sixths

$$\frac{1}{6} + \frac{3}{6} = \frac{4}{6}$$



Adding Fractions

(b) $\frac{5}{6}$ of 18 =

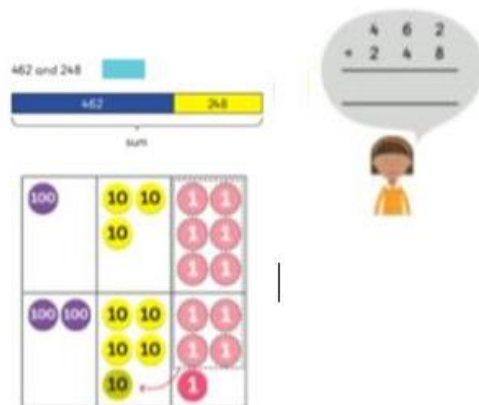


Move onto problem solving involving these methods and bar models.

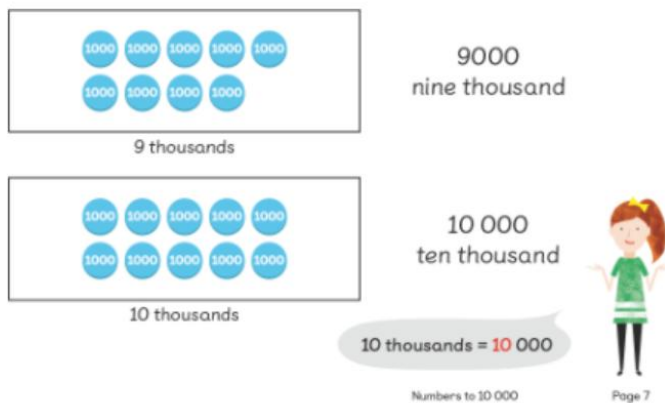
Year 4 Mathematics Policy

Place Value

Re-capping methods taught in Year 3, as well as applying it to measure problems straight away (e.g. money).

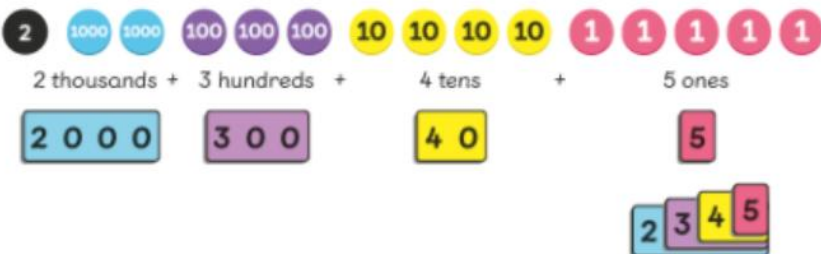


Numbers to 10,000





2 thousands + 3 hundreds + 4 tens + 5 ones



Use a place-value chart.

2 thousands + 3 hundreds + 4 tens + 5 ones

thousands	hundreds	tens	ones
2	3	4	5



$$2345 = 2000 + 300 + 40 + 5$$

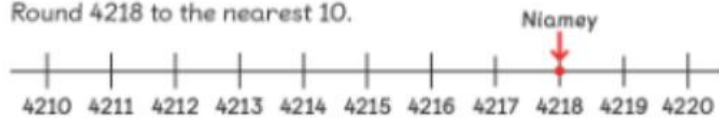


We write 2345 as two thousand, three hundred and forty-five.

2345 is a 4-digit number.

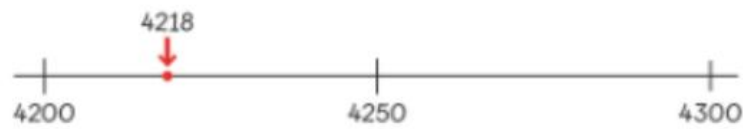


Round 4218 to the nearest 10.



4218 is between 4210 and 4220.

Round 4218 to the nearest 100.

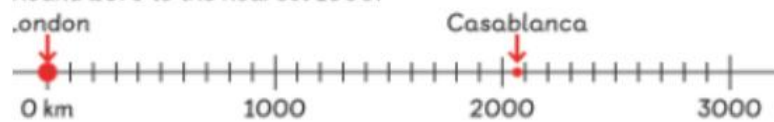


4218 is between 4200 and 4300.

4218 is closer to 4200 than to 4300.
4218 is 4200 when rounded to the nearest 100.



Round 2078 to the nearest 1000.



2078 is between 2000 and 3000.

2078 is closer to 2000 than to 3000.

We say 2078 is 2000 when rounded to the nearest 1000.



In Focus

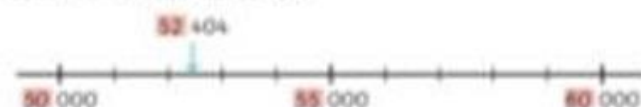


Ravi's mother went shopping.

She bought a handbag for £58, a pair of shoes for £73 and a dress for £35.

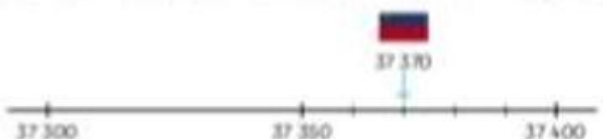
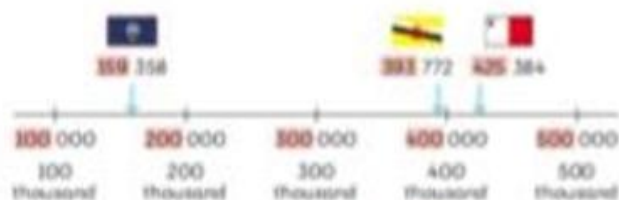
Estimate the total cost of these three items.

St James' Park can seat 52 404.



52 404 is closer to 50 000 than to 60 000.

**Rounding to the nearest
100, 1000, 10 000 and 100,000**



37 370 is closer to 37 400 than to 37 300.

Addition

Children are expected to be secure in methods taught in Year 3.

Let's estimate.

5	7	0	0
+	1	2	0
6	9	0	0

Children are expected to estimate answers to check accuracy

Find the sum of 2034 and 9.



$$2034 + 10 = 2044$$

$$2034 + 9 = 2043 \quad \text{1 less}$$

Why is the sum 1 less?

Learning mental strategies to add

Find the sum of 98 and 4142 by adding mentally.

$$98 + 4142 = \boxed{}$$

make 100

$$98 + 4142 = 100 + 4140$$

$$= 4240$$

Addition – No renaming

In Focus



saved £2314.



saved £4240 more than



saved.

How much did



save?

Let's Learn

1



2314



4240

?

We need to find the sum of 2314 and 4240.



2

Find the sum of 2314 and 4240.

1000 1000	100 100 100	10	1 1 1 1
1000 1000 1000 1000	100 100	10 10 10 10	

Use number discs to help you.



$$\begin{array}{r}
 2 \ 3 \ 1 \ 4 \\
 + \ 4 \ 2 \ 4 \ 0 \\
 \hline
 6 \ 5 \ 5 \ 4
 \end{array}$$



Step 1

Add the ones.
4 ones + 0 ones = 4 ones

Step 2

Add the tens.
1 tens + 4 tens = 5 tens

Step 3

Add the hundreds.
3 hundreds + 2 hundreds = 5 hundreds

Step 4

Add the thousands.
2 thousands + 4 thousands = 6 thousands

$$2314 + 4240 = 6554$$



saved £6554.

Subtraction- No regrouping

- 1 Find the difference between 358 and 128.



$$358 - 128 = \square$$

When we subtract numbers,
we get the difference.



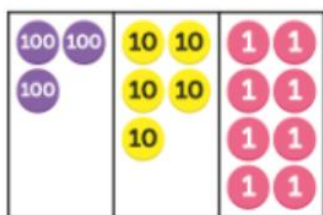
Use base-ten blocks



$$\begin{array}{r}
 3 \ 5 \ 8 \\
 - \ 1 \ 2 \ 8 \\
 \hline
 2 \ 3 \ 0
 \end{array}$$

The difference between 358 and 128 is 230.

- 2 Find the difference between 358 and 129.

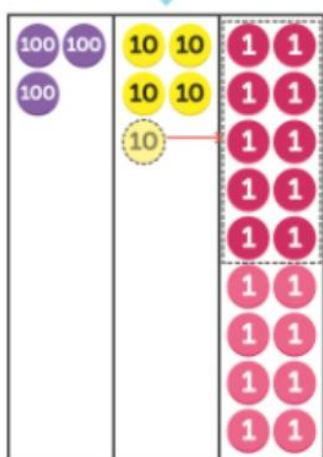


There are not enough ones.

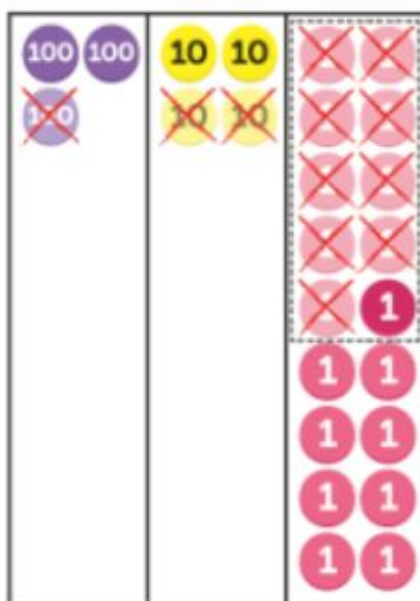


$$\begin{array}{c} 358 \\ \swarrow \quad \downarrow \quad \searrow \\ 300 \quad 40 \quad 18 \end{array}$$

358



subtract
129



$$\begin{array}{r} 358 \\ \begin{array}{r} 300 \\ - 100 \\ \hline 200 \end{array} \quad \begin{array}{r} 40 \\ - 20 \\ \hline 20 \end{array} \quad \begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array} \end{array}$$

$$\begin{array}{r} 3 \quad 4 \quad 18 \\ - 1 \quad 2 \quad 9 \\ \hline 2 \quad 2 \quad 9 \end{array}$$

$$358 - 129 = 229$$

The difference between 358 and 129 is 229.

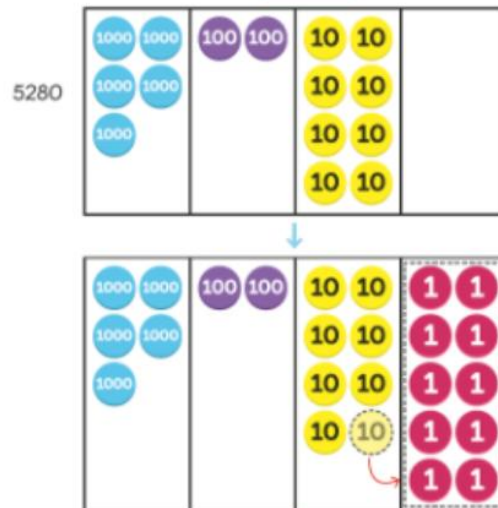
Subtraction- With regrouping

In Focus

After Ruby spent £3169, how much was left?

Let's Learn

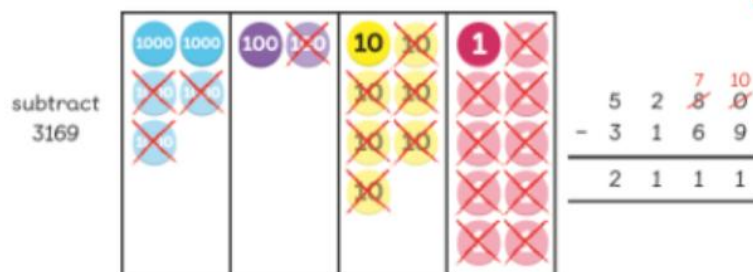
I have £5280 with me.



There aren't enough ones.



$$\begin{array}{r}
 5 \quad 2 \quad \overset{7}{\cancel{8}} \quad \overset{10}{\cancel{0}} \\
 - 3 \quad 1 \quad 6 \quad 9 \\
 \hline
 \end{array}$$



5280			
5 thousands	2 hundreds	7 tens	10 ones
- 3 thousands	- 1 hundred	- 6 tens	- 9 ones
<u>2 thousands</u>	<u>1 hundred</u>	<u>1 ten</u>	<u>1 one</u>

$$5280 - 3169 = 2111$$

£2111 was left.

$$\begin{array}{r}
 2 \quad 1 \quad 1 \quad 1 \\
 + 3 \quad 1 \quad 6 \quad 9 \\
 \hline
 5 \quad 2 \quad 8 \quad 0
 \end{array}$$



Bar Model Method

A baker made 2750 chocolate cookies and 1638 vanilla cookies.
He sold 3195 cookies altogether.
How many cookies did he have left?

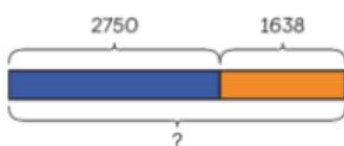


Let's Learn

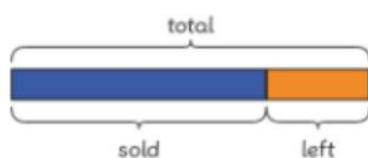
1 Understand the problem

Who?	 baker
What?	 cookies

Make a plan



Find the total number of cookies he made.



Then, subtract the number of cookies sold.



Carry out the plan

$$2750 + 1638 = 4388$$

The baker baked 4388 cookies.

$$4388 - 3195 = 1193$$

He had 1193 cookies left.

Check

Cookies sold	3195
Cookies left	1193
Cookies baked	4388

$$\begin{array}{r} 1 \\ 2750 \\ + 1638 \\ \hline 4388 \end{array}$$

$$\begin{array}{r} 2 \quad 18 \\ 4388 \\ - 3195 \\ \hline 1193 \end{array}$$

$$\begin{array}{r} 3195 \\ + 1193 \\ \hline 4388 \end{array}$$



In Focus

On Saturday, 3018 people attended a funfair. 850 more people attended the funfair on Saturday than attended it on Sunday.

Altogether, how many people attended the funfair over the two days?



Let's Learn

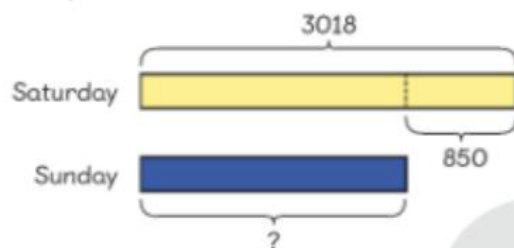
1 Understand the problem

Who?	 people
What?	funfair

Make a plan



Carry out the plan



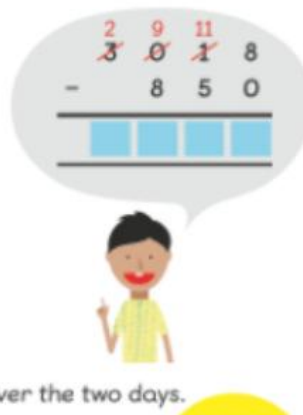
$$3018 - 850 = 2168$$

2168 people attended the funfair on Sunday.

$$\begin{array}{r} \text{Saturday} \quad 3 \quad 0 \quad 1 \quad 8 \\ \text{Sunday} \quad + \quad 2 \quad 1 \quad 6 \quad 8 \\ \hline \quad \quad 5 \quad 1 \quad 8 \quad 6 \end{array}$$

$$3018 + 2168 = 5186$$

Altogether, 5186 people attended the funfair over the two days.



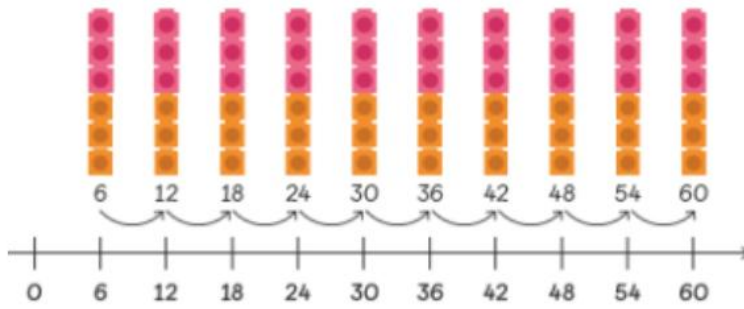
Multiplication



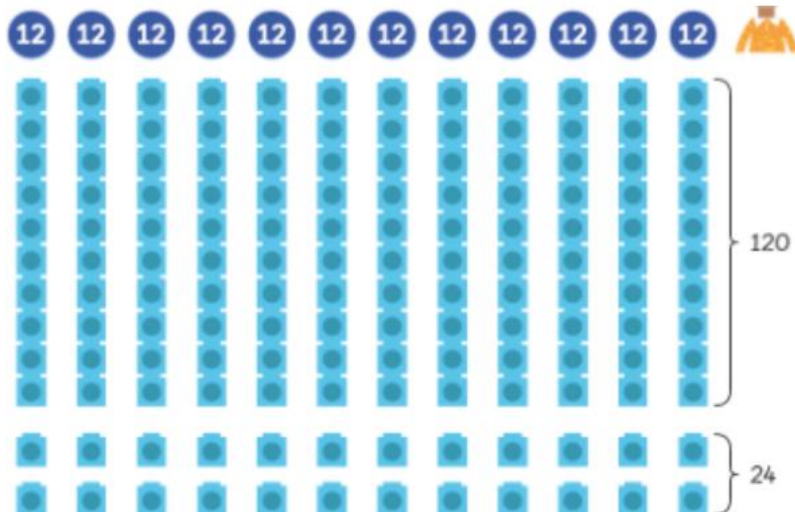
2 groups of 6
 $2 \times 6 = 12$

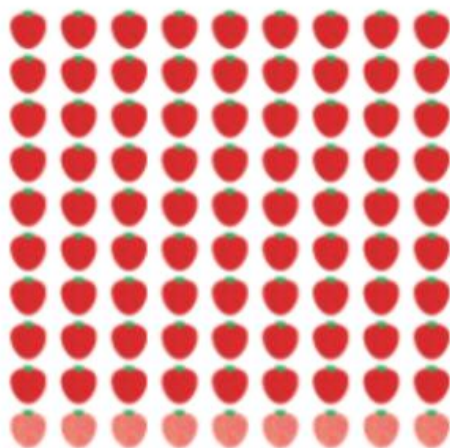


3 groups of 6
 $3 \times 6 = 18$



$2 \times 7 = 14$
 $3 \times 7 = 14 + 7$





10 rows of 9 = 90
 $10 \times 9 = 90$

$10 \times 9 = 90$
 What is 9×9 ?
 How can we tell?



$$3 \times 10 = 30$$

$$3 \times 1 = 3$$

$$3 \times 11 = 30 + 3$$

Recap: bridged and short multiplication

$\begin{array}{r} \times \quad 23 \\ \hline 46 \\ + 120 \\ \hline 138 \end{array}$	$\begin{array}{r} \times \quad 23 \\ \hline 46 \\ 130 \\ \hline 138 \end{array}$
--	--

New: multiplying 3 numbers

$$2 \times 5 \times 6$$

$$2 \times 5 \times 6 = 10 \times 6 = 60$$



$$2 \times 5 \times 6$$



$$2 \times 5 \times 6 = 10 \times 6 = 60$$

$$\begin{array}{r} \times \quad 473 \\ \hline 1881 \\ + 3286 \\ \hline 2267 \end{array}$$



Recap:
Bridged and short
multiplication

$$\begin{array}{r} \times \quad 473 \\ \hline 1881 \\ 3286 \\ \hline 2267 \end{array}$$

What is the product of 9 and 30?

$$9 \times 30 =$$

Method 1

$$\begin{array}{r} 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ 30 \\ + 30 \\ \hline \end{array}$$

Method 2

$$\begin{array}{l} 9 \times 3 = 27 \\ 9 \times 3 \text{ tens} = 27 \text{ tens} \\ 9 \times 30 = 270 \end{array}$$

Method 3

$$\begin{array}{l} 9 \times 30 = 9 \times 3 \times 10 \\ = 27 \times 10 \\ = 27 \text{ tens} \\ = 270 \end{array}$$



Which method is best?

Recap multiplying by a multiple of 10

New: multiplying by multiples of 100

$$7 \times 300 =$$

Method 1

$$\begin{array}{r} 300 \\ 300 \\ 300 \\ 300 \\ 300 \\ 300 \\ 300 \\ + 300 \\ \hline 2100 \end{array}$$

Method 2

$$\begin{array}{l} 7 \times 3 = 21 \\ 7 \times 3 \text{ hundreds} = 21 \text{ hundreds} \\ 7 \times 300 = 2100 \end{array}$$

Method 3

$$\begin{array}{l} 7 \times 300 = 7 \times 3 \times 100 \\ = 21 \times 100 \\ = 21 \text{ hundreds} \\ = 2100 \end{array}$$

21 hundreds = 2100



Which method is best?

Division

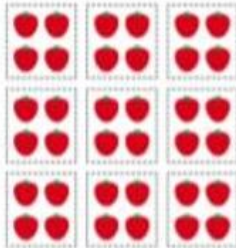
$$36 \div 9 = ?$$

'equal groups'

VS

'groups of'

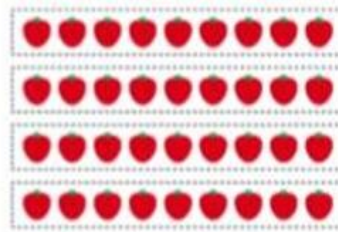
Placing into 9 equal groups



$$36 \div 9 = 4$$

Each group has 4 strawberries.

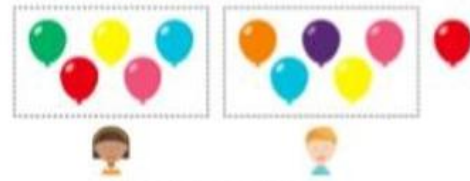
Placing in groups of 9



$$36 \div 9 = 4$$

There are 4 groups.

There were 11 balloons.



$$11 \div 2 = 5 \text{ remainder } 1$$

The quotient is 5 and the remainder is 1.

Each friend got 5 balloons.

There was 1 balloon left over.

Children are introduced to the concept of remainders

1

$$4 \div 4 = \square$$



$$4 \div 4 = 1$$

2

$$40 \div 4 = \square$$



$$40 \div 4 = 10$$

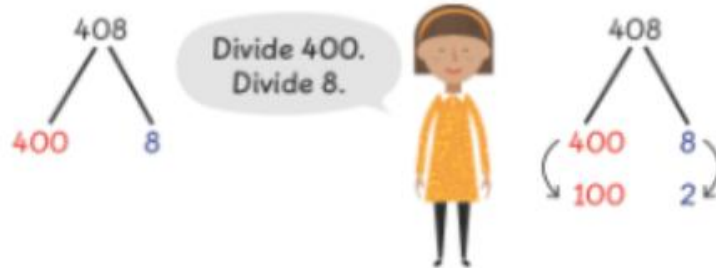
3

$$400 \div 4 = \square$$

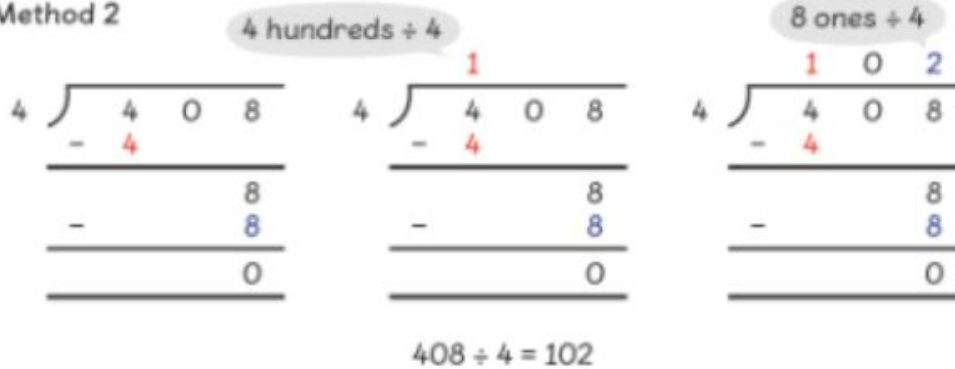


$$400 \div 4 = 100$$

Method 1

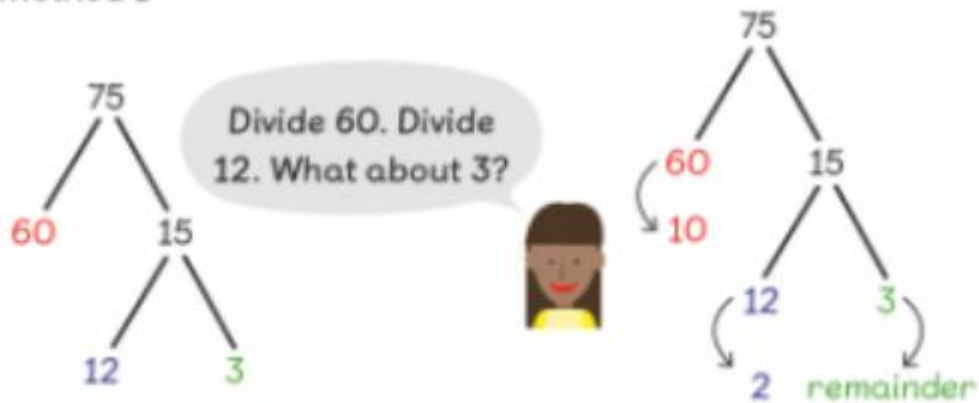


Method 2



Once confident with the partitioning and long division methods, remainders are introduced using these methods.

Method 1



Method 2

6 tens ÷ 6

$$\begin{array}{r} 6 \overline{) 75} \\ \underline{- 6} \\ 15 \\ \underline{- 12} \\ 3 \end{array}$$

12 ones ÷ 6

$$\begin{array}{r} 6 \overline{) 75} \\ \underline{- 6} \\ 15 \\ \underline{- 12} \\ 3 \end{array}$$

remainder

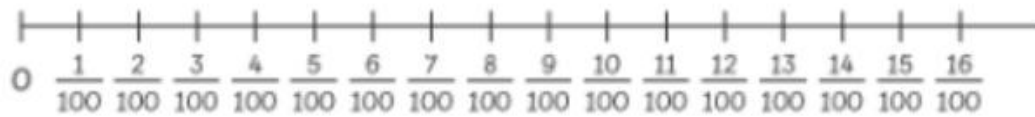
$75 \div 6 = 12 \text{ remainder } 3$

quotient

It is not possible to put 75 children into 6 equal groups.

Move onto problem solving involving these methods and bar models

Fractions



There are 2 whole cakes and 5 sixths of a cake.

$$2 + \frac{5}{6} = 2\frac{5}{6}$$

$2\frac{5}{6}$ is a mixed number.



$$\frac{12}{8} = \frac{3}{2}$$

÷ 4 (top arrow)
÷ 4 (bottom arrow)

8 smaller parts become
2 larger parts.



$$\frac{6}{4} = \frac{3}{2}$$

÷ 2 (top arrow)
÷ 2 (bottom arrow)

4 smaller parts become
2 larger parts.



Decimals



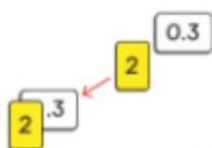
makes 1 1 0.1 0.1 0.1 .

1	0.1	0.1
1	0.1	
ones	tenths	
2	3	

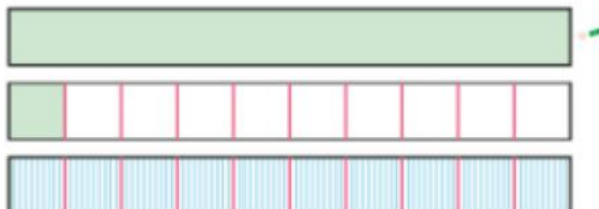
$$\begin{aligned} & 2 \text{ ones} + 3 \text{ tenths} \\ & = 2 + 0.3 \\ & = 2.3 \end{aligned}$$

The digit 2 stands for 2 ones.

The digit 3 stand for 3 tenths.



We read 2.3 as two
and three tenths.



tens	ones	tenths	hundredths
0	8	1	3

The digit 3 stands for $\frac{3}{100}$

0.03 0.03 0.03



8.13 is read as eight and thirteen hundredths.

tens	ones	tenths	hundredths
0	3	1	8

The digit 3 stands for 3.

The digit 1 stands for $\frac{1}{10}$

The digit 8 stands for $\frac{8}{100}$

$$\begin{array}{r} 20 + 30 = 2 \\ 3 + 30 = 0.3 \\ 23 + 30 = 2.3 \end{array}$$

I get 2.3 sheets of paper.



tens	ones	tenths
2	3	

→ 10 →

tens	ones	tenths
	2	3

$$\begin{array}{r} 34 + 100 = \\ 30 + 100 = 0.3 \\ 4 + 100 = 0.04 \\ 34 + 100 = 0.34 \end{array}$$

hundredths

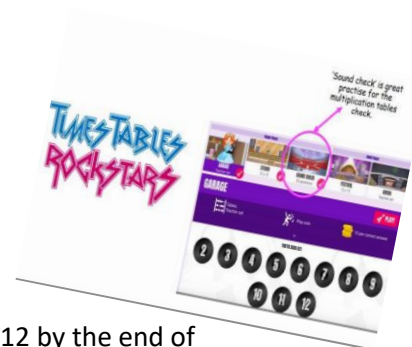
tens	ones	tenths	hundredths
1	4		

→ 100 →

tens	ones	tenths	hundredths
	0	1	4

YEAR 4 - Multiplication tables check

- From the 2019/20 academic year onwards, schools in England will be required to administer an online multiplication tables check (MTC) to year 4 children.
- The national curriculum specifies that children should be taught to recall the multiplication tables up to and including 12×12 by the end of year 4.
- The purpose of the MTC is to determine whether pupils can recall their times tables fluently, which is essential for future success in mathematics. It will help schools to identify pupils who have not yet mastered their times tables, so that additional support can be provided.

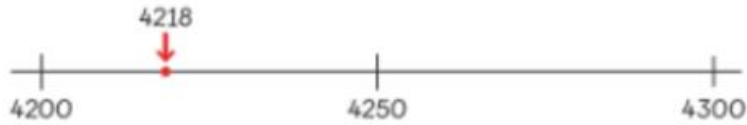


Here at The Beeches, we use Times Table Rockstars to best support the children in the lead up to this. The Sound Check area mirrors the layout in which the MTC will have.

Year 5 Mathematics Policy

Place Value

Round 4218 to the nearest 100.

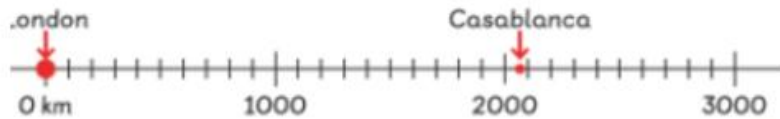


4218 is between 4200 and 4300.

4218 is closer to 4200 than to 4300.
4218 is 4200 when rounded to the nearest 100.



Round 2078 to the nearest 1000.



2078 is between 2000 and 3000.
2078 is closer to 2000 than to 3000.

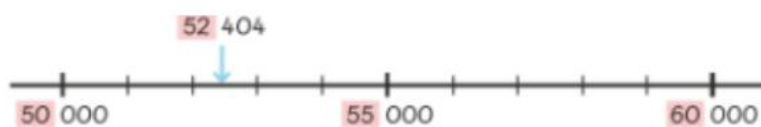
We say 2078 is 2000 when rounded to the nearest 1000.



In Focus



Ravi's mother went shopping.
She bought a handbag for £58, a pair of shoes for £73 and a dress for £35.
Estimate the total cost of these three items.

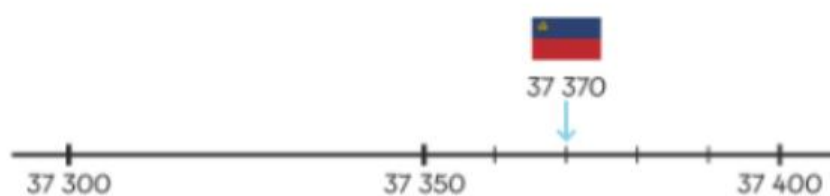


52 404 is closer to 50 000 than to 60 000.

52 404 is approximately 50 000.



$52\,404 \approx 50\,000$
(rounded to the nearest 10 000)

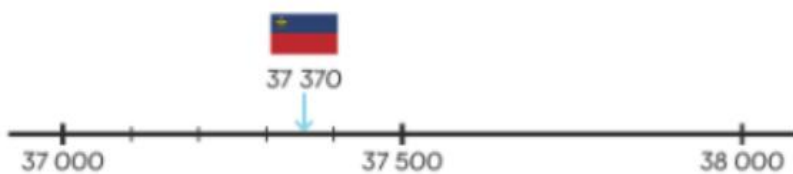


37 370 is closer to 37 400 than to 37 300.

We say 37 370 is approximately 37 400.



$37\,370 \approx 37\,400$ (rounded to the nearest 100)



37 370 is closer to 37 000 than to 38 000.

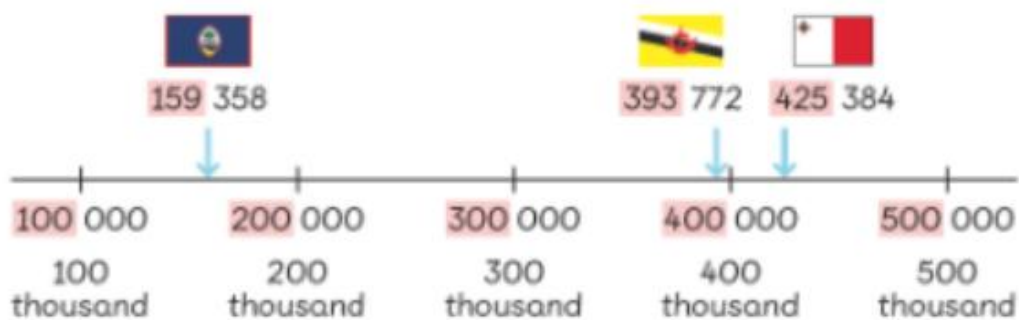
37 370 is
approximately
37 000.



37 370



$37\,370 \approx 37\,000$ (rounded to the nearest 1000)



393 772 is closer to 400 000 than to 300 000.

425 384 is closer to 400 000 than to 500 000.

2	6	3	1	5	0	263 150
2	6	3	0	0		26 300
2	6	3	8	7		26 387

263 150 is more than two hundred thousand.



26 300 and 26 387 are each only slightly more than twenty-six thousand.

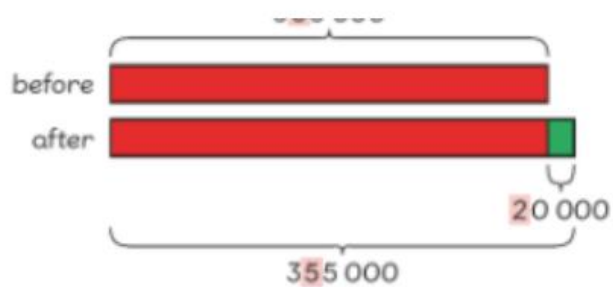
263 150 is the greatest of the three numbers.

26 300 is 300 more than 26 000.

26 387 is 387 more than 26 000.

26 300 is less than 26 387.

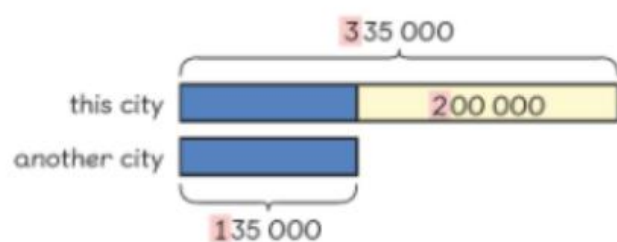
$263\,150 > 26\,387 > 26\,300$



20 000 is
2 ten thousands.



The digit in the ten thousands
place increases by 2.

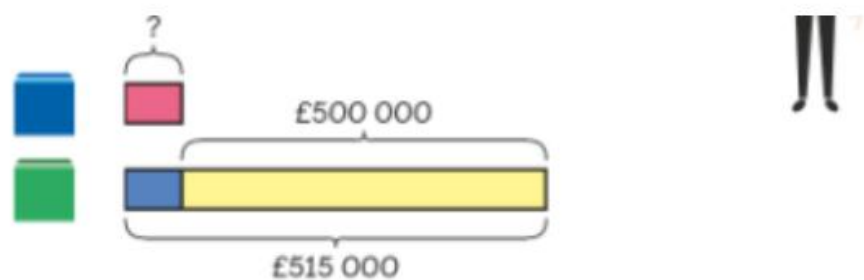


200 000
is 2 hundred
thousands.



The digit in the hundred
thousands place decreases by 2.





Method 1 Make a list.

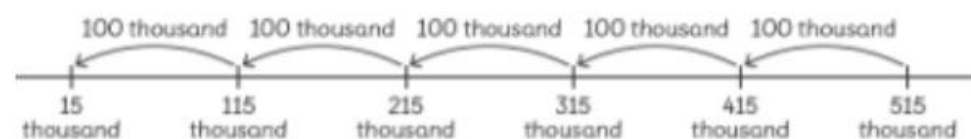
515 000
415 000
315 000
215 000
115 000
15 000

Count back.

Is it possible to use subtraction?

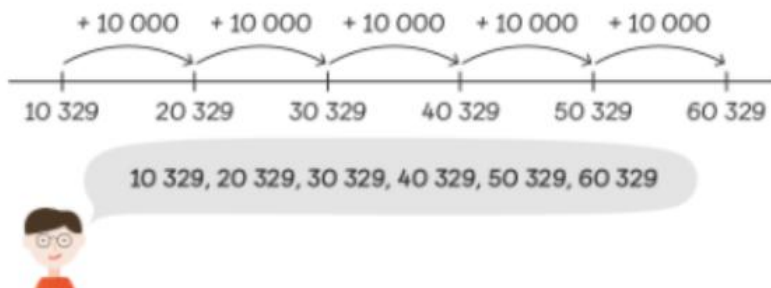
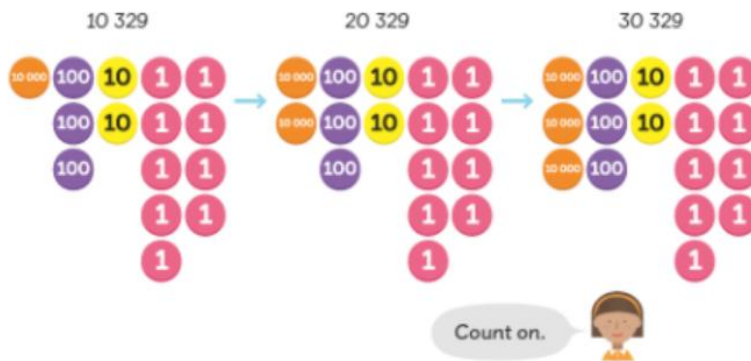


Method 2 Use a number line.



Addition

1 $10\ 329 + 50\ 000 =$



	A	B	C
1	Date	Trip	Fare
2	13 September	Airport to Hotel	150 000
3	14 September	Hotel to Office	40 000
4		Office to Hotel	45 000
5	15 September	Hotel to Office	43 000
6		Office to Hotel	42 000
7		Hotel to Restaurant	25 000
8		Restaurant to Hotel	21 000
9	16 September	Hotel to Office	46 000
10		Office to Airport	150 000
11			
12		Total for Taxi Fare	562 000

I round each amount to the nearest 10 000.

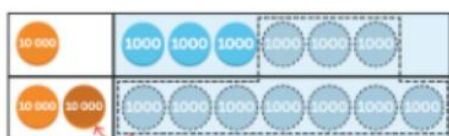
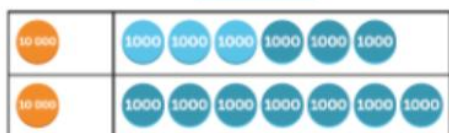


$$\begin{array}{r}
 40\ 000 \\
 40\ 000 \\
 + 40\ 000 \\
 \hline
 120\ 000
 \end{array}$$

$$\begin{array}{r}
 37\ 000 \\
 + 12\ 000 \\
 \hline
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r} 120\ 000 \\ + 120\ 000 \\ \hline \end{array}$$

1 $16\ 000 + 17\ 000 =$



$$\begin{array}{r} 16\ 000 \\ + 17\ 000 \\ \hline \end{array}$$

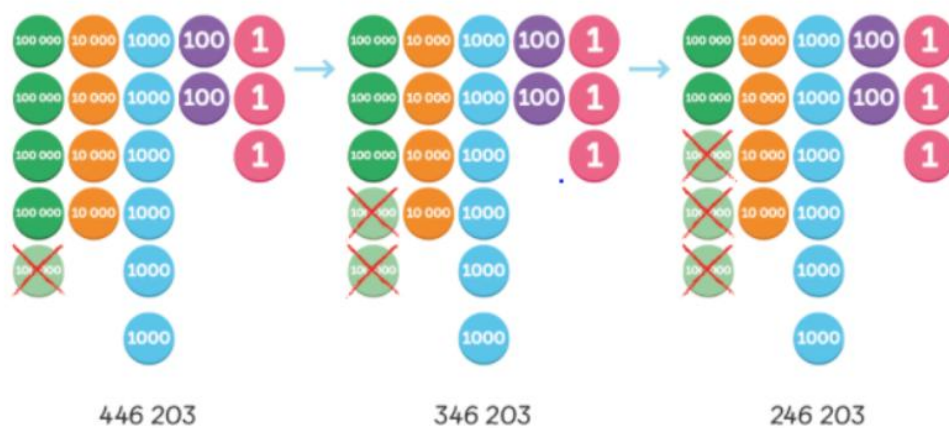
$$\begin{array}{r} \overset{1}{1}6\ 000 \\ + 17\ 000 \\ \hline 3\ 000 \end{array}$$

$$\begin{array}{r} \overset{1}{1}6\ 000 \\ + 17\ 000 \\ \hline 33\ 000 \end{array}$$

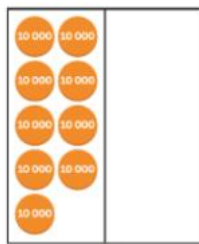
Subtraction

By counting back

The number is 546 203.
Count back by 100 000s.



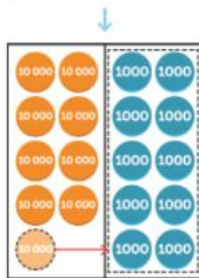
Subtraction with re-grouping



There are not enough **1000** to subtract 4000.



$$\begin{array}{r} 8 \text{ } 10 \\ \cancel{9} \cancel{0} \text{ } 000 \\ - 54 \text{ } 000 \\ \hline \end{array}$$



Rename 90 000.



$$\begin{array}{r} 90 \text{ } 000 \\ \swarrow \quad \searrow \\ 80 \text{ } 000 \quad 10 \text{ } 000 \end{array}$$

$$\begin{array}{r} 8 \text{ } 10 \\ \cancel{9} \cancel{0} \text{ } 000 \\ - 54 \text{ } 000 \\ \hline 36 \text{ } 000 \end{array}$$

Regrouping in each place value column

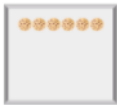
$$\begin{array}{r} 9 \text{ } 12 \\ \cancel{1} \cancel{0} \cancel{2} \text{ } 7 \\ - 359 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ 9 \text{ } 12 \text{ } 17 \\ \cancel{1} \cancel{0} \cancel{2} \cancel{7} \\ - 359 \\ \hline 668 \end{array}$$

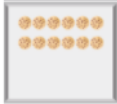
Finding multiples



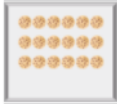
bakes 4 rows of biscuits.



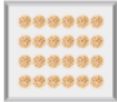
$$1 \times 6 = 6$$



$$2 \times 6 = 12$$



$$3 \times 6 = 18$$



$$4 \times 6 = 24$$

We say 6, 12, 18 and 24 are multiples of 6.

Find the first 12 multiples of 6.

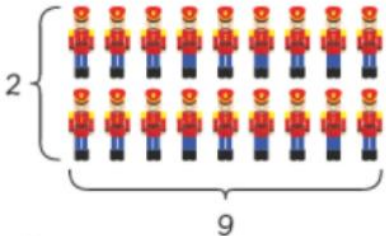
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

Finding factors

Place 18 toy soldiers in a rectangular arrangement.



does it this way.



$$18 = 2 \times 9$$

“



2 is a factor of 18.
9 is also a factor of 18.

Prime numbers

number	factors
5	1 and 5
7	1 and 7
4	1, 2 and 4
9	1, 3 and 9
6	1, 2, 3 and 6
8	1, 2, 4 and 8

5 and 7 are prime numbers.

4, 9, 6 and 8 are not prime numbers.



Common factors

Find the common factors of 48 and 64.

$$48 = 1 \times 48$$

$$64 = 1 \times 64$$

$$48 = 2 \times 24$$

$$64 = 2 \times 32$$

$$48 = 3 \times 16$$

$$64 = 4 \times 16$$

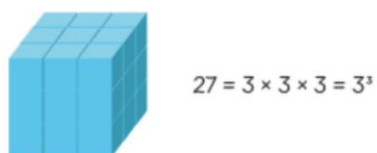
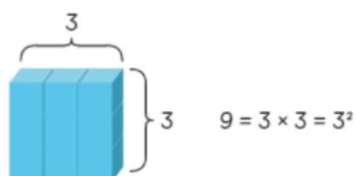
$$48 = 4 \times 12$$

$$64 = 8 \times 8$$

$$48 = 6 \times 8$$

The common factors of 48 and 64 are 1, 2, 4, 8 and 16.

Square and cube numbers



27 is a cube.

12×10	12×100	12×1000
		
$12 \times 10 = 12 \times 1 \text{ ten}$ $= 12 \text{ tens}$	$12 \times 100 = 12 \times 1 \text{ hundred}$ $= 12 \text{ hundreds}$	$12 \times 1000 = 12 \times 1 \text{ thousand}$ $= 12 \text{ thousands}$



Multiplication

$$\begin{array}{r}
 2718 \\
 \times \quad 4 \\
 \hline
 32 \\
 40 \\
 2800 \\
 + 8000 \\
 \hline
 10872
 \end{array}$$

$$\begin{array}{r}
 \overset{3}{2}718 \\
 \times \quad 4 \\
 \hline
 2
 \end{array}$$

$$\begin{array}{r}
 \overset{3}{2}718 \\
 \times \quad 4 \\
 \hline
 72
 \end{array}$$

$$\begin{array}{r}
 \overset{2}{2}\overset{3}{7}18 \\
 \times \quad 4 \\
 \hline
 872
 \end{array}$$

$$\begin{array}{r}
 \overset{2}{2}\overset{3}{7}18 \\
 \times \quad 4 \\
 \hline
 10872
 \end{array}$$

Recap:

Bridged and short multiplication but with larger numbers

Place value counters are initially used alongside the column method to support pictorially

$$2718 \times 4 = 10872$$

$$\begin{array}{r}
 1 \\
 4 \\
 28 \\
 \times 26 \\
 \hline
 168 \\
 + 560 \\
 \hline
 728
 \end{array}$$

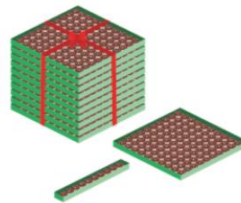
New:
Multiplying 2 and 3 digit numbers by 2-digit numbers

$$\begin{array}{l}
 168 \rightarrow 28 \times 6 \\
 + 560 \rightarrow 28 \times 20
 \end{array}$$

$$\begin{array}{r}
 28 \\
 \times 26 \\
 \hline
 8 \\
 168 \\
 \hline
 728
 \end{array}
 \rightarrow
 \begin{array}{r}
 28 \\
 \times 26 \\
 \hline
 168 \\
 560 \\
 \hline
 728
 \end{array}
 \rightarrow
 \begin{array}{r}
 28 \\
 \times 26 \\
 \hline
 168 \\
 560 \\
 \hline
 728
 \end{array}
 \rightarrow
 \begin{array}{r}
 28 \\
 \times 26 \\
 \hline
 168 \\
 560 \\
 \hline
 728
 \end{array}$$

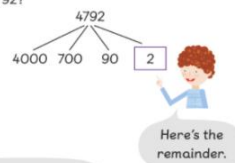
Division

How many  can we get from 4792  ?
 How many  can we get from 4792  ?
 How many  can we get from 4792  ?



How many  can we get from 4792?

 contains 10 pieces.



How many
10s in 4790?

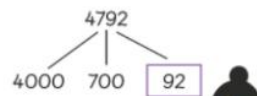
$$\begin{array}{l}
 4790 \div 10 = 479 \\
 479 \text{ tens} \div 1 \text{ ten} = 479
 \end{array}$$

There are 479 groups
of 10 in 4790.



How many  can we get from 4792?

 contains 100 pieces.



How many
100s in 4700?

$$\begin{array}{l}
 4700 \div 100 = 47 \\
 47 \text{ hundreds} \div 1 \text{ hundred} = 47
 \end{array}$$



There are 47 groups
of 100 in 4700.

How many  can we get from 4792?

 contains 1000 pieces.



How many
1000s in 4000?

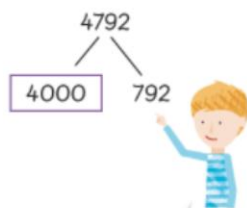
There are 4  in 4000.

$$4000 \div 1000 = 4$$

$$4 \text{ thousands} \div 1 \text{ thousand} = 4$$



There are 4 groups
of 1000 in 4000.

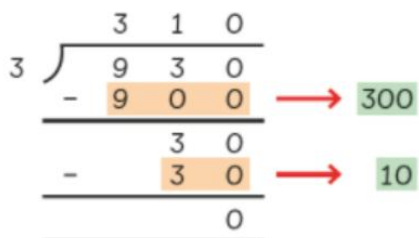
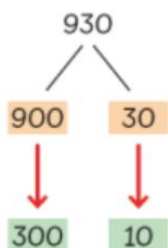
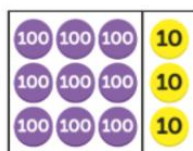


Here is the
remainder.

Further Division

$$900 \div 3 = 300$$

930



Dividing with
place value
counters

$930 \div 3$

100	100	100	10
100	100	100	10
100	100	100	10

$2528 \text{ ml} \div 8 =$

Dividing a
thousands
number with
long division

930

Dividing a
hundreds
number with
long division

$4 \overline{) 108} \rightarrow 4 \overline{) 108}$

Short division

$3 \overline{) 51} \rightarrow 3 \overline{) 51}$

Fractions

Improper fractions, mixed numbers and simplifying

Sharing objects to write as improper and mixed numbers

$$5 \div 3 = 1 \frac{2}{3}$$



3 apples shared equally among 3 friends.

$$3 \div 3 = 1$$



The remaining 2 apples are shared equally among 3 friends.

$$2 \div 3 = \frac{2}{3}$$

Adding fraction pairs before adding fractions with different denominators

1 sixth and 4 sixths

$$\frac{1}{6} \text{ and } \frac{4}{6} \text{ make } \frac{5}{6}$$



$$\frac{1}{6} \text{ and } \frac{2}{3} \text{ make } \frac{5}{6}$$

$$\frac{4}{6} = \frac{2}{3}$$

Making denominators the same and simplifying the answers



$$\frac{1}{9}$$

$$\frac{1}{3}$$

$$\frac{1}{3} = \frac{3}{9}$$

$$\frac{1}{9} + \frac{3}{9} = \frac{4}{9}$$

$$\frac{1}{9} + \frac{1}{3} = \frac{4}{9}$$

$$\frac{1}{9} + \frac{1}{3} = \frac{4}{9}$$

$$\frac{1}{9} + \frac{1}{3} = \frac{4}{9}$$

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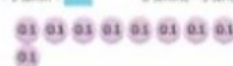
$$\frac{1}{9} + \frac{1}{3} = \frac{4}{9}$$

Decimals

Find the sum and the difference.

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$



$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

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$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

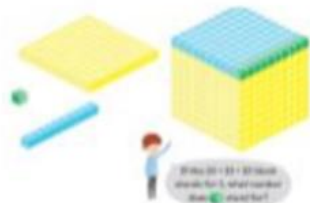
$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

$$0.2 + 0.1 = 0.3$$

$$0.2 - 0.1 = 0.1$$

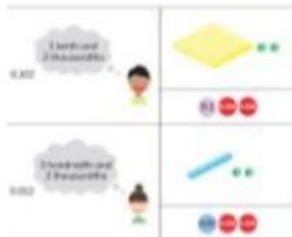


Write 0.01 + 0.01 + 0.01 down. How many 0.01s make 0.03?

thousandths

Other areas covered by decimals:

- Comparing and ordering
- Money
- Weight
- Rounding
- Perimeter



$$0.1$$

$$0.2$$

$$0.3$$

$$0.4$$

$$0.5$$

$$0.6$$

$$0.7$$

$$0.8$$

$$0.9$$

$$1.0$$

$$1.1$$

$$1.2$$

$$1.3$$

$$1.4$$

$$1.5$$

$$1.6$$

$$1.7$$

$$1.8$$

$$1.9$$

$$2.0$$

$$2.1$$

$$2.2$$

$$2.3$$

$$2.4$$

$$2.5$$

$$2.6$$

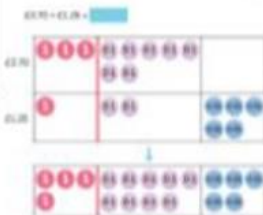
$$2.7$$

$$2.8$$

$$2.9$$

Using base blocks	In hundredths	In tenths
	$\frac{1}{10} = 0.1$	1 tenth
	$\frac{2}{10} = 0.2$	2 tenths
	$\frac{3}{10} = 0.3$	3 tenths
	$\frac{4}{10} = 0.4$	4 tenths
	$\frac{5}{10} = 0.5$	5 tenths
	$\frac{6}{10} = 0.6$	6 tenths
	$\frac{7}{10} = 0.7$	7 tenths
	$\frac{8}{10} = 0.8$	8 tenths
	$\frac{9}{10} = 0.9$	9 tenths
	$\frac{10}{10} = 1.0$	10 tenths

Representing in fractions and decimals



$$0.1$$

$$0.2$$

$$0.3$$

$$0.4$$

$$0.5$$

$$0.6$$

$$0.7$$

$$0.8$$

$$0.9$$

$$1.0$$

$$1.1$$

$$1.2$$

$$1.3$$

$$1.4$$

$$1.5$$

$$1.6$$

$$1.7$$

$$1.8$$

$$1.9$$

$$2.0$$

$$2.1$$

$$2.2$$

$$2.3$$

$$2.4$$

$$2.5$$

$$2.6$$

$$2.7$$

$$2.8$$

$$2.9$$

$$3.0$$

$$3.1$$

$$3.2$$

$$3.3$$

$$3.4$$

$$3.5$$

Adding and subtracting decimals



$$0.1$$

$$0.2$$

$$0.3$$

$$0.4$$

$$0.5$$

$$0.6$$

$$0.7$$

$$0.8$$

$$0.9$$

$$1.0$$

$$1.1$$

$$1.2$$

$$1.3$$

$$1.4$$

$$1.5$$

$$1.6$$

$$1.7$$

$$1.8$$

$$1.9$$

$$2.0$$

$$2.1$$

$$2.2$$

$$2.3$$

$$2.4$$

$$2.5$$

Year 6 Mathematics Policy

On the lead up to SATs, the children should be encouraged to use formal written methods for all four of the operations.

Addition and Subtraction

$789 + 642 \text{ becomes}$ $\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \hline \end{array}$	$874 - 523 \text{ becomes}$ $\begin{array}{r} 874 \\ - 523 \\ \hline 351 \\ \hline \end{array}$	$932 - 457 \text{ becomes}$ $\begin{array}{r} 8 \quad 12 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \\ \hline \end{array}$	$932 - 457 \text{ becomes}$ $\begin{array}{r} 1 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \\ \hline \end{array}$
---	--	--	---

Multiplication

$24 \times 16 \text{ becomes}$ $\begin{array}{r} 24 \\ \times 16 \\ \hline 144 \\ 240 \\ \hline 384 \\ \hline \end{array}$	$124 \times 26 \text{ becomes}$ $\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ \hline \end{array}$	$124 \times 26 \text{ becomes}$ $\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ \hline \end{array}$
---	---	---

Division

$98 \div 7 \text{ becomes}$ $\begin{array}{r} 14 \\ 7 \overline{) 98} \\ \underline{7} \\ 28 \\ \underline{28} \\ 0 \end{array}$	$432 \div 5 \text{ becomes}$ $\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array}$	$496 \div 11 \text{ becomes}$ $\begin{array}{r} 45 \text{ r } 1 \\ 11 \overline{) 496} \\ \underline{44} \\ 56 \\ \underline{55} \\ 1 \end{array}$
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PIXL Policy

The Beeches Primary School uses the Maths No Problem scheme and supplements the arithmetic with PIXL; to ensure pupils are provided opportunities to develop fluency becoming efficient mathematicians.

Arithmetic is a branch of Mathematics that consists the study of numbers and basic calculations we do in everyday life: addition, subtraction, multiplication and division. Arithmetic also includes other skills that are related to the four operations, e.g. fractions and percentage that are related to division.

PIXL is used in a range of ways across different year groups. Largely, after teaching a sequence of lessons, you will have collected a range of evidence to show what pupils can and cannot do.

A PIXL Classroom lesson is an intervention lesson that you will deliver at the end of a sequence of lessons that will focus on a single PLC skill. The PLC skill will have been identified as an area of weakness with the aim of ensuring that all pupils make progress.

PIXL has a range of Mathematical resources that will enable you to create a bespoke and heavily differentiated set of activities that will ensure all students are involved in the learning and are shown to make progress in one lesson.

All pupils from Year 2 and above have arithmetic books to keep their PIXL separate from their journaling and MNP workbooks.

Each year groups uses PIXL in the following ways:

Year 2

PIXL is used as extra intervention with twice a week to support target children to meet the expected standard. It is also used as a revision tool once children have completed test papers. PIXL resources are utilised to revise strands of mathematics that have been identified as areas of weakness to plug the gaps.

Year 3

PIXL Arithmetic 10 in 10 tests are undertaken every other week. The arithmetic test is undertaken as a 'walking, talking mock.' Follow up work is then planned related to the test once a week using PIXL resources.

Year 4

PIXL Arithmetic 10 in 10 tests and a 3 in 3 are undertaken every week. The arithmetic test is undertaken as a 'walking, talking mock.'

Year 5

PIXL 3 in 3s are used one day per week, for a 3-minute starter for maths lessons. In addition to this, PIXL Arithmetic 10 in 10 tests are undertaken once a week. The PIXL tests informs the priority therapies and we follow the PLCs from Y5 maths.

Year 6

PIXL 3 in 3s are used every day as a 3-minute starter for maths lessons. The PIXL tests informs the priority therapies and we follow the PLCs from Y6 maths. In addition to this, the PIXL resources are utilised in tuition lessons and for pre-teaching lessons.