

Parent Guide to mathematics in Year 3

- Ark Academy follows the Mathematics Mastery approach in Years R, 1,2,3 and 4.
- This will move up through the school with the children.
- In years 5 and 6 the National Curriculum is followed but using a mastery approach and supported by the maths scheme Abacus.



Key Principles

Mathematical thinking

Pupils deepen their understanding by giving an examples, by sorting or comparing, or by looking for patterns and rules in the representations they are exploring problems with.

Conceptual understanding

Pupils deepen their understanding by representing concepts using objects and pictures, making connections between different representations and thinking about what different representations stress and ignore.

Conceptual understanding

Mathematical problem solving

Mathematical thinking

Language and communication

Language and communication

Pupils deepen their understanding by explaining, creating problems, justifying and proving using mathematical language. This acts as a scaffold for their thinking deepening their understanding further.

Addition & subtraction in Year 3

Same as Year 2

Add and subtract numbers mentally, including:

- a three-digit number and ones; $321 + 8$ $321 - 9$
- a three-digit number and tens; $321 + 20$ $321 - 20$
- a three-digit number and hundreds $321 + 200$ $321 - 200$

Column method with three and four digit numbers; bridging 1,000

1. Add/subtract the ones
2. Regroup (above the tens)
3. Add/subtract the tens

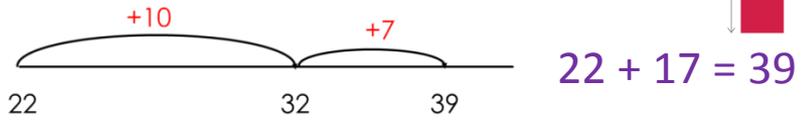
$$\begin{array}{r} 734 \\ + 286 \\ \hline \end{array}$$

	⁸ 9	¹² 8	¹ 2
-	4	5	7
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	4	7	5

Addition & subtraction in Year 2



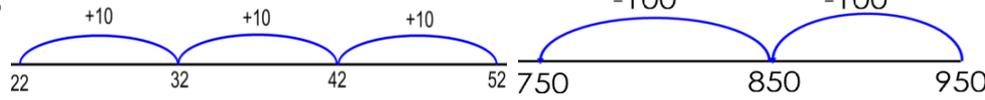
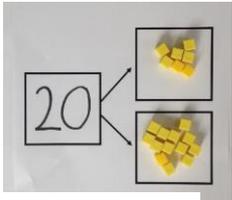
Partitioning one number



Rounding one number



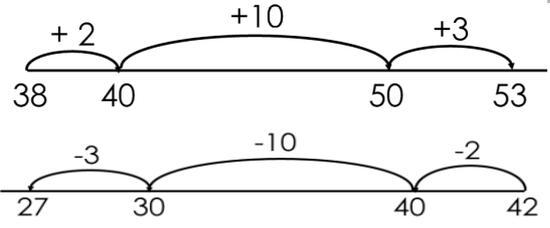
Counting on in tens and hundreds



Part – part – whole

$20 = 7 + 13$
 $20 - 13 = 7$

Make 10



$38 + 15 = 53$
 $42 - 15 =$
 2 13
 10 3

hundreds tens ones

$$\begin{array}{r} 1 \overset{3}{4} 7 \\ - 18 \\ \hline 1 \overset{1}{2} 9 \end{array}$$

Column method

	tens	ones
	2	4
+	1	7
<hr/>		

1. Add/subtract the ones
2. Regroup (above the tens)
3. Add/subtract the tens

Using known facts

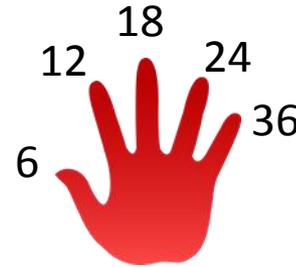
$3 + 4$
 $30 + 40$
 $300 + 400$

$8 - 4$
 $80 - 40$
 $800 - 400$



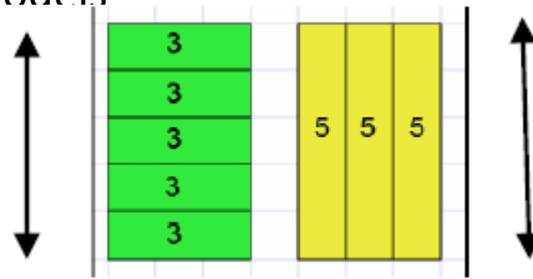
Multiplication & division in Year 3

Skip counting in multiples of 2, 3, 4, 5, 6, 8 and 10



Doubling to derive new multiplication facts

Part-part whole with arrays and bar models

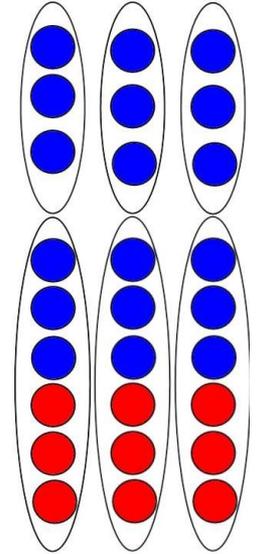


$$3 \times 3 = 9$$

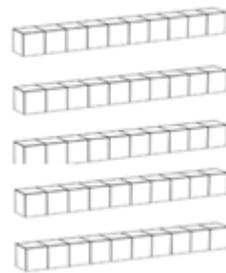
$$3 \times 6 = 18$$

$$5 = 1 \times 5$$

$$50 = 10 \times 5$$



$$50 \div 10 = 5$$



$$500 = 100 \times 5$$

$$5000 = 1000 \times 5$$

Using known facts for multiplying and dividing by multiples of 10, 100 and 1000

Multiplying & dividing of 2-digit numbers with partitioning (no regrouping & regrouping)

×	10	2
3	30	6

$$3 \times 12 = 36$$

×	10	4
3		

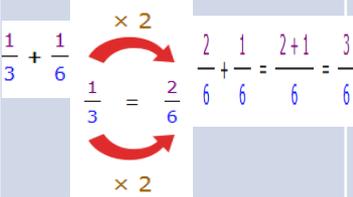
$$14 \times 3 = 42$$

thousands	hundreds	tens	ones

$$48 \div 4 = 12$$

Challenge

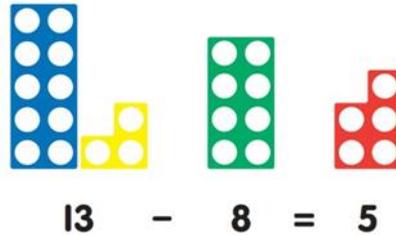
- Fractions, decimals, percentages

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
$\frac{1}{2}$ and $\frac{1}{4}$	$\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{1}{3}$	Add and subtract fractions with the same denominator up to one whole $\frac{1}{4} + \frac{1}{4} = \frac{1+1}{4} = \frac{2}{4}$	Add and subtract fractions with the same denominator where the answer may be an improper fraction $\frac{4}{8} + \frac{5}{8} = \frac{9}{8}$	Add and subtract fractions where one denominator is a multiple of another 	Add and subtract fractions with different denominators Multiply simple pairs of proper fractions Divide proper fractions by whole numbers $\frac{1}{3} + \frac{1}{4} \qquad \frac{4}{12} + \frac{3}{12} = \frac{4+3}{12} = \frac{7}{12}$
				Find 10% of a number Find a multiple of 10% of a number Find 5% of a number Find 10% of £90 90 = 100% 9 = 10% 18 = 20%	Find a multiple of 5% of a number Find 1% of a number Find 5% of £90 90 = 100% 9 = 10% 4.5 = 5%

- Development of written methods e.g. long multiplication and long division.

Concrete, Visual, Abstract

The principle of the CVA approach is that for children to have a true understanding of a mathematical concept there are three phases they need to master: concrete, pictorial and abstract. Reinforcement is achieved by going back and forth between these representations.



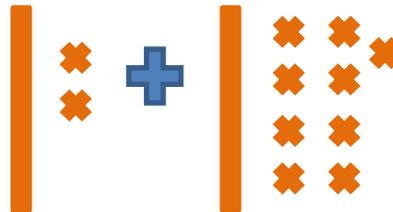
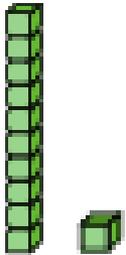
$$13 - 8$$

Active/concrete



Building visual images

Abstract

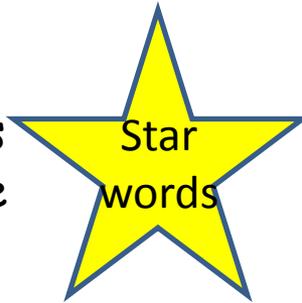


$$12 + 19$$

Language & Reasoning

The 2014 National Curriculum is explicit in articulating the importance of children using the correct mathematical language as a central part of their learning.

The Talk Task is a crucial opportunity for children to perform tasks where recording is at a minimum with the focus instead being on the correct use of mathematical language.



Write as many words meaning '+' symbol as possible in 15 seconds.

Megan has made a 3-digit number with these cards.



What is the largest number you can make with these cards?
Explain your answer.

Why?

Why not?

What if?

Problem solving & Arithmetic



Word problems:

There are 10 people on a bus. 4 people get on and 3 people get off. How many people are left on the bus?

Finding patterns:

How many squares would be shaped in the 6th shape in this sequence? How do you know?



Mental arithmetic is an important life skill and regular practice is critical. Without fluency in mental maths to underpin their work in number, children will struggle with many other areas of mathematics. Children who are fluent with number will be able to use their mental arithmetic skills to find efficient strategies for completing calculations, recalling and applying number knowledge rapidly and accurately.

Year 1	Year 2	Year 3	Year 4
Number bonds within 10 and 20. Roll 2, 10 and 5 times tables	Recall the 2, 5 and 10 times tables	Recall the 2, 3, 4, 5, 8 and 10 times tables	Recall all times tables up to 12 x 12

How you can support at home



Measuring

- **Cooking**- weighing and following instructions
- **Measure yourself!** - make a height strip. Keep a graph to show your growth! How much have you grown?
- **Measure stuff!** - use a tape measure
- **Telling the time**- how long until...? Analogue /digital time, Days of the week, dates, keep a calendar/

Picnic or Party maths:

- Preparing food for a group of people is a real problem solving opportunity; how many cups can we fill with one jug, how many pieces of pizza can we cut from each one? A great opportunity to use terms like 'half' 'quarter' 'double' and put those tables into practice.



How you can do Maths at Home



Shopping games:

- Set up a mini supermarket in the kitchen and give the children some real money to go shopping with.
- Change can be the trickiest concept and needs to be taught in 'real' shopping activities which can be done really well at home.

Number games

- Board games
- Snakes and ladders
- Dominoes
- Playing card games eg snap, doubles
- Dice games eg exchange game
- Have fun playing with a calculator and try out those signs!



Shapes everywhere

- **Shopping Shape Sort**; let your child loose on the packages and sort them into cuboids, cylinders, cubes
- **2-D shape pictures and patterns**
- Which shapes can you draw? you will need a ruler for some of them!



Props around the house

Ideas taken from **Maths for Mums and Dads** Eastaway, R. and Askew, M. (2010)

- **A prominent clock**- digital and analogue is even better. Place it somewhere where you can talk about the time each day.
- **A traditional wall calendar**-Calendars help with counting days, spotting number patterns and
- **Board games that involve dice or spinners**-helps with counting and the idea of chance
- **A pack of playing cards**- Card games can be adapted in many ways to learn about number bonds, chance, adding and subtracting
- **A calculator**- A basic calculator will help with maths homework when required, there are also many calculator games you can play, too.
- **Measuring Jug**-Your child will use them in school, but seeing them used in real life is invaluable. Also useful for discussing converting from metric to imperial
- **Dried beans, Macaroni or Smarties**- for counting and estimating
- **A tape measure and a ruler**- Let your child help when measuring up for furniture, curtains etc
- **A large bar of chocolate** (one divided into chunks)- a great motivator for fractions work
- **Fridge magnets with numbers on**- can be used for a little practice of written methods
- **Indoor/outdoor Thermometer**- especially useful in winter for teaching negative numbers when the temperature drops below freezing
- **Unusual dice**- not all dice have faces 1-6, hexagonal dice, coloured dice, dice from board games all make talking about chance a little more interesting
- **A dartboard with velcro darts**- Helps with doubling, trebling, adding and subtracting.

<http://www.mathsisfun.com/>

<http://www.mathletics.co.uk/>

<http://www.bbc.co.uk/education>

Glossary

Thousands	Hundreds	Tens	Ones

Abstract – Written down calculation

Array – Objects or numbers arranged in rows and columns

Bar model – Picture representations in the form of bars to represent relationships between facts in a problem

Concrete – Hands on, practical resources

Denominator – The bottom number in a fraction

Digit – A symbol used to make numerals 0-9

Dividend – The amount you want to divide up

Divisor – The number you divide by

Mathematics Mastery - A tool to used to assist the teaching and learning from Reception to Year 4, on a rolling programme

Numerator – The bottom number in a fraction

Partitioning – Splitting a number into parts

Place value - The value of where the digit is in the number (see diagram)

Re-grouping - Making groups of tens when adding or subtracting two digit numbers (or more) and is another name for 'carrying' and 'borrowing'

Rounding - Making a number simpler but keeping its value close to what it was

Skip counting - Counting forwards or backwards by a number other than 1

Vinculum - The horizontal line used to separate the numerator and denominator in a fraction

Visual – Mathematical concepts represented by pictures