Parent Guide to mathematics in Year 5

- 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 5
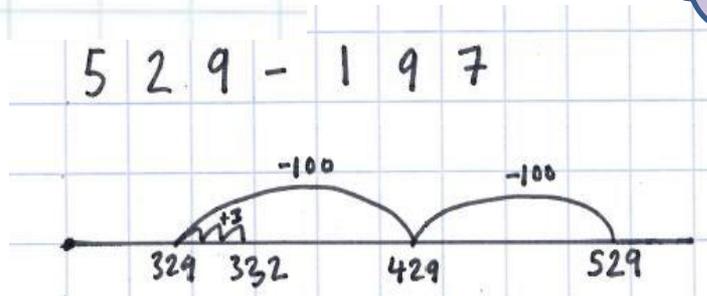
Column method with up to four digits

£ 6 4 . 5 0
+ £ 1 9 . 6 3
£ 8 4 . 1 3

Keep decimals aligned

Not most efficient method

Rounding or blank number line

Year 5 and 6: Add whole numbers with more than 4 digits, including using formal written methods (columnar addition).
Consolidate previous learning and apply it in multi-step problems.
Mentally add numbers using known facts.

Multiplication in Year 4, 5 & 6
Short multiplication
(Any number multiplied by a one digit number)

Year 5: Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers

Year 6: Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

$$24 \times 6 =$$

$$
\begin{array}{rr}
 & 2\ 4 \\
\times & 6 \\
\hline
1 & {}^2 4\ 4 \\
\hline
\end{array}
$$

1. Multiply the ones
2. Regroup the tens (if needed)
3. Multiply the tens
4. Add the re-grouped tens

Multiplication in Year 4, 5 & 6
Short division
(With a one digit divisor)

**96 ÷ 4 = 24**

bus stop
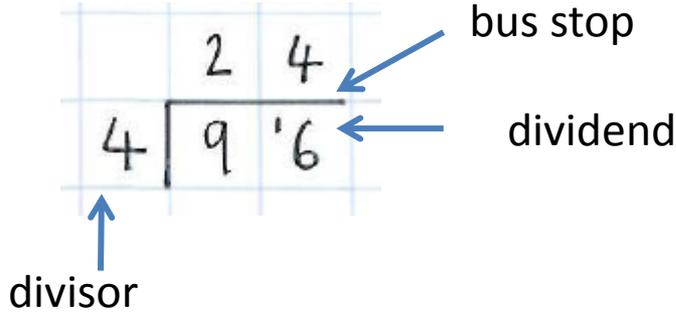
dividend

divisor

1. Divide the first number inside the bus stop by the divisor.
2. Write the answer on top and write the remainder, small, before the ones within the dividend.
3. Divide the second number (two digit number i.e. 16) by the divisor and record the answer at the top of the bus stop.

As above, when there is a remainder once the ones within the dividend has been divided by the divisor:
4. Insert a decimal point after the ones with the bus stop and above the bus stop (within the answer)
5. Write the remainder, small, after the decimal point and insert a zero as a place holder i.e. 40
6. Divide the tenths by the divisor and record the answer after the decimal above the bus stop.

If there is a remainder write in small with the bus stop and write a zero as a place holder.

79 ÷ 5 = 15.8

$1\ 5\ .\ 8$

$5\ \overline{)\ 7^2\ 9.\ ^4\ 0}$

$1\ 5\quad r4$

$5\ \overline{)\ 7^2\ 9}$
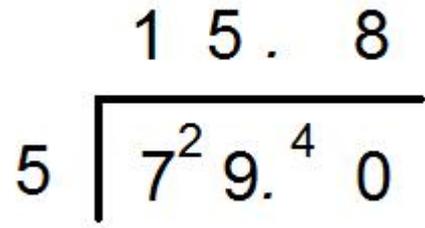
$15\ \dfrac{4}{5}$
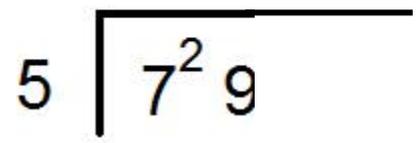
Multiplication in Year 5 & 6
Formal written method
(Any number multiplied by two or more digits)

24 x 16 =

Same as short multiplication, and then:

5. Place a zero in the ones column
6. Multiply the tens by the ones
7. Regroup the tens (if needed)
8. Multiply the tens by the tens
9. Add the re-grouped tens
10. Draw an equals
11. Add each column, starting with the ones to the tens to the hundreds

```
    2  4
x   1  6
─────────
 1 ²4  4
+2  4  0
─────────
 3  8  4
─────────
```

Zero as the place holder for the ones column

```
      502
 x    336
─────────
     3012
    15060
+  150600
─────────
   168,672
```

Zero as the place holder for the ones column

Two zeroes as the place holder for the ones and ten column

Division in Year 5 & 6
Formal written method
(With a two digit divisor)
Chunking by repeated subtraction

$$4\ 3\ 2 \div 1\ 5$$

$$
\begin{array}{r}
2\ 8\ \frac{4}{5} \quad \text{or} \quad 2\ 8\ .\ 8 \\
1\ 5\ \overline{)\ 4\ 3\ 2} \\
3\ 0\ 0 \quad (2\ 0 \times 1\ 5) \\
-\ ^0\cancel{4}\ ^1\cancel{3}\ ^12 \\
7\ 5 \quad (5 \times 1\ 5) \\
-\quad 5\ 7 \\
4\ 5 \quad (3 \times 1\ 5) \\
1\ 2
\end{array}
$$

Tip: Simplify the fraction

$$\frac{12}{15} = \frac{4}{5} = 0.8$$

1. Use known multiplication facts to chunk i.e. 15 x 2 = 30 so 15 x 20 = 300.
2. Record the answer below the number inside the bus stop and write the multiplication in brackets on the right hand side)
3. Subtract the two numbers and write the answer below.
4. Repeat the above steps until you can no longer divide the dividend by the divisor.
5. Total the numbers in the brackets which were multiplied by the divisor and write the answer above the bus stop.

abacus

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Division in Year 5 & 6
Formal written method
(With a two digit divisor)

abacus

$$\frac{12}{15} = \frac{4}{5} = 0.8$$

How to Divide!

Does ÷ (divide)

McDonald's X (multiply)

Serve − (subtract)

Burgers? ⬇ (bring down)

Repeat

1. Divide the divisor into the first digit of the dividend. If it can't divide then look at the next digit as a two digit number and divide.
2. Record the answer at the top of the bus stop i.e. 15 goes into 43 two times, 15 x 2 = 30
3. Take the answer away from the two digit number at the start of the bus stop i.e. 43 – 30 = 13
4. Carry down the ones from under the bus stop i.e. 132
5. Repeat the above steps until the divisor can no longer go into the dividend

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Challenge

- Fractions, decimals, percentages

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
½ and ¼	¼, 2/4, ¾, 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 $\frac{1}{3} + \frac{1}{6} \quad \frac{2}{6} + \frac{1}{6} = \frac{2+1}{6} = \frac{3}{6}$ $\frac{1}{3} = \frac{2}{6}$	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%
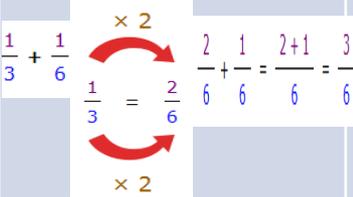
- Development of written methods e.g. long multiplication and long division.

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.

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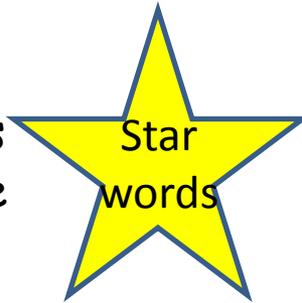
Megan has made a 3-digit number with these cards.

6	7	5

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

Why?
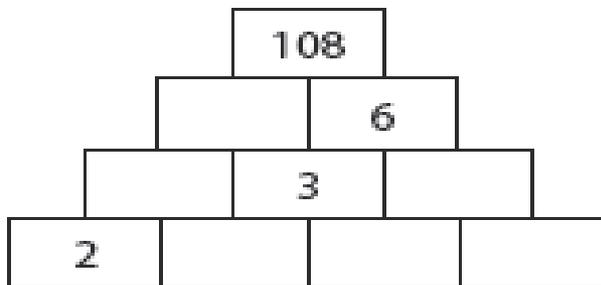
Why not?

What if?

Problem solving

A 50 cm length of wood is cut into 4 cm pieces.
How many 4 cm pieces are cut and how much
wood is left over?

Finding patterns:

Fill in the missing numbers in this multiplication pyramid.

108

	6

	3	

2			

Arithmetic

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!

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Props around the house

- **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

Abacus – A tool used to assist the teaching and learning in Year 5 and 6

Abstract – Written down calculation

Bridging – Moving through the 10, 100, 1000 boundary

Bus stop – Visual representation used for to lay out short division

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

Improper fraction – Where a fraction is top heavy; the numerator is larger than the denominator

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

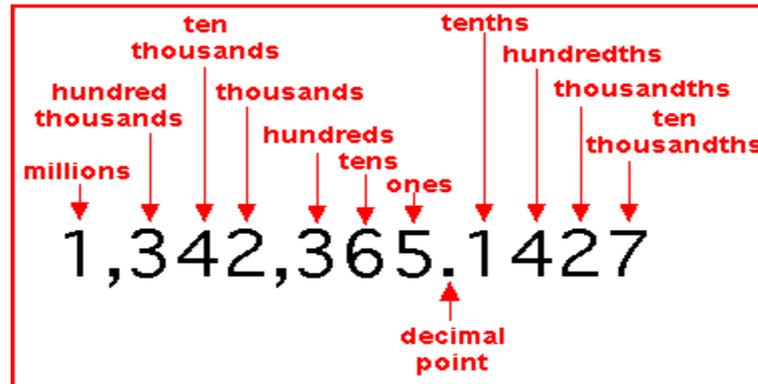**Mixed number fraction** - A whole number and a fraction combined

Numerator – The bottom number in a fraction

Glossary

Partitioning – Splitting a number into parts

Place holder - A significant zero in the decimal representation of a number

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

Proper fraction - A fraction where the numerator is less than the denominator

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

Remainder - The amount left over after division

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

Simplify - Divide the top and bottom by the highest number that can divide into both numbers in the fraction exactly

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