# Year 4 Maths Workshop

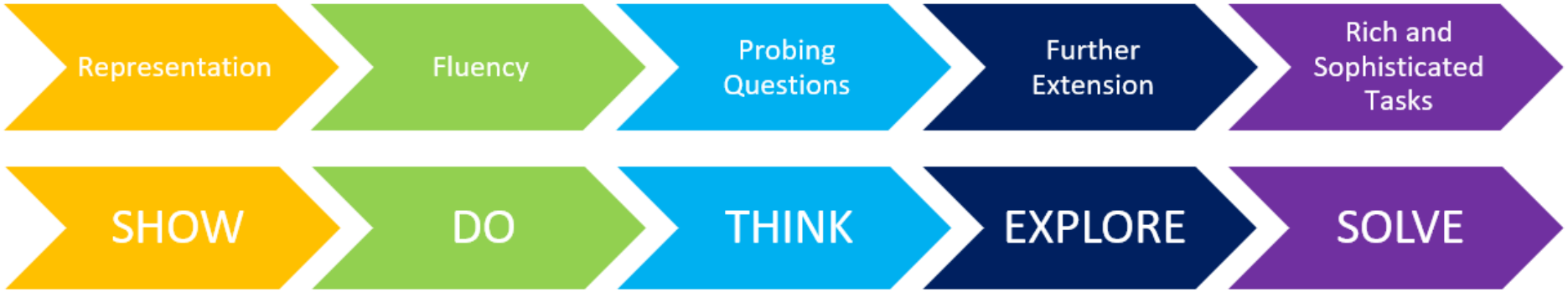

Tuesday 29th November 2022

# Aims:

- To understand how maths is taught at Highwood
- To understand the age related expectations in maths
- To understand how you can help your children at home
- To have a better understanding of the maths language used in teaching maths

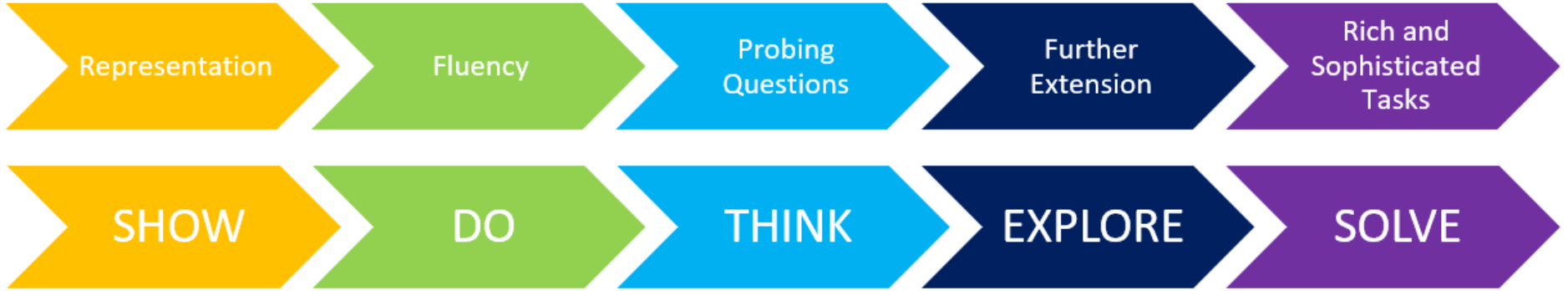
# How is maths taught at Highwood?

- We follow White Rose Hub to help up plan our small steps and use a mastery flow within our lessons
- The process encourages pupils to become fluent in the fundamentals of maths through frequent practice with increasing complexity over time




- Children move through the mastery flow process at their own pace. Some children might be on do while others have moved through the other stages and are now on solve.
- Adults support children, identifying misconceptions and addressing them throughout the lesson
- We build children who are not only inquisitive learners, but resilient problem solvers, who have the confidence to try and try again. They are confident mathematical communicators who can explain, justify and reason

# What happens at each stage of the flow?




| SHOW | DO | THINK | EXPLORE | SOLVE |
|---|---|---|---|---|
| Teachers introduce a learning objective taken from the NC.<br><br>Practical resources, talk partner work, verbalising understanding | Varied fluency happens at this stage.<br><br>Children explore fluency questions that are only about the objective being taught. | Questions are used to elicit children's reasoning skills.<br><br>They are asked to explain, convince and justify their answers.<br><br>It is only about the objective being taught. | Questions and problems that explore multiple objectives.<br><br>Linked to prior learning. | Questions and problems that explore multiple objectives.<br><br>They may not have a clear starting point, need children to problem solve or include trial and error. |

# Mastery flow

LO: recognise the place value in a 4 digit number.

# Representation - SHOW

| Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|
| | 1,000 1,000 | 100 100 | 10 10 10 10 | 1 1 1 1 |

Q: What is the value of the underlined digit?

2<u>2</u>44

Answer: 200

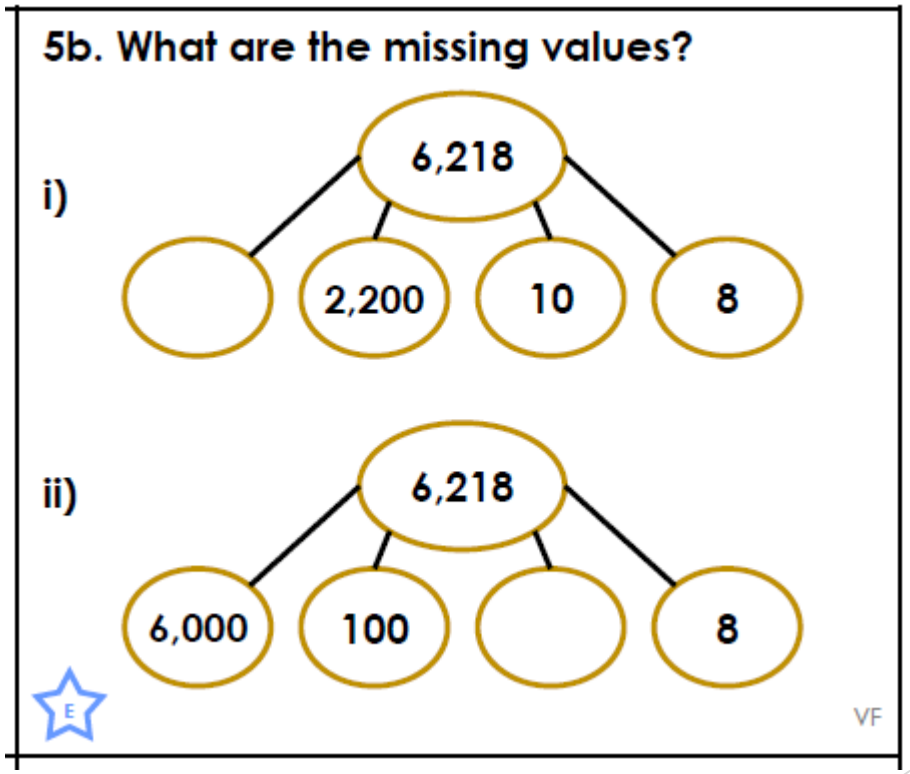
This level of answer often involves using physical equipment and practical resources – last week, we used counters to explore factors of numbers by arranging them in rows of 2, 3, 4, 5, 6 and so on. Pupils prove their understanding of a mathematical concept in a concrete way.

# Varied Fluency - DO

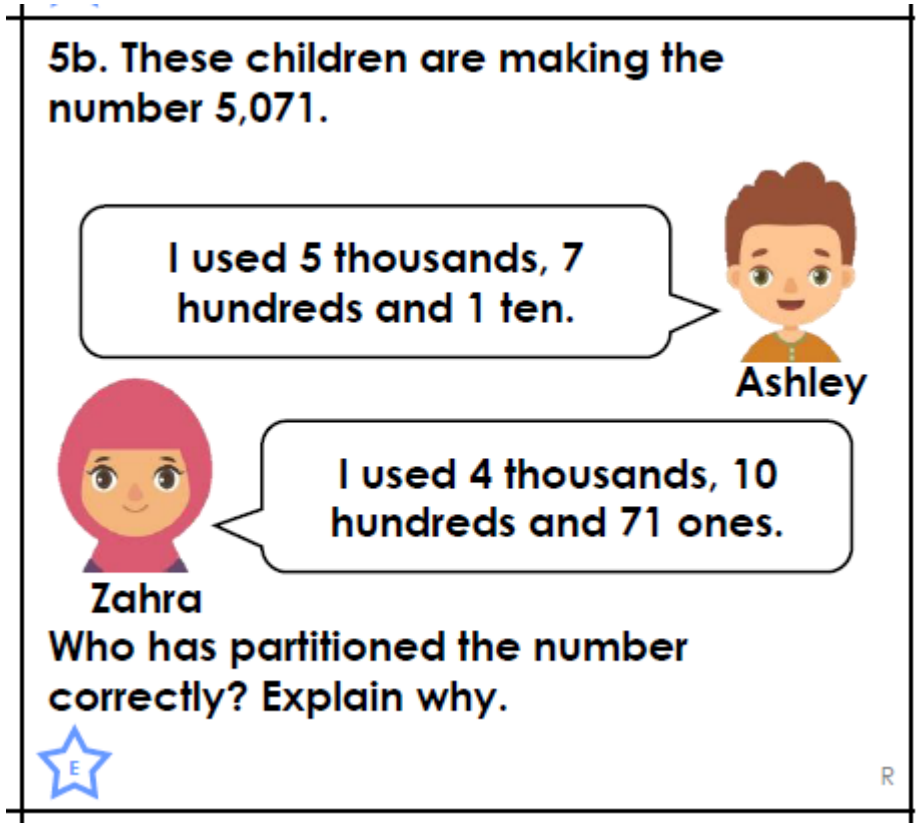
DO Task 1.
Write the VALUE of the underlined digit:

a) 8546
b) 1185
c) 7777
d) 12,901

DO or Fluency tasks are when pupils prove their understanding through applying the concept in the abstract.



# THINK




**ALWAYS, SOMETIMES, NEVER?**

A number containing the digit 9 will be bigger than those that do not.

Use examples to EXPLAIN your answer.

THINK tasks involve having to do one or more steps to answer the question and often involve problem solving and explaining your answer.

# EXPLORE

Questions and problems that explore multiple objectives.

Linked to prior learning.

## Four-digit Targets

**Age 7 to 11** ★

You have two sets of the digits from 0 to 9.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

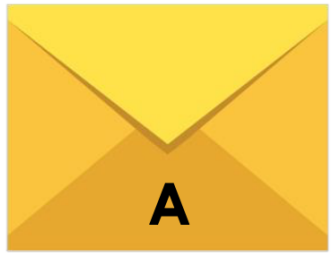
The idea is to arrange these digits in the five boxes to make four-digit numbers as close to the target number as possible.
You may use each digit once only.

| | |
|---|---|
| | largest odd number |
| | largest even number |
| | largest multiple of 3 |
| | smallest multiple of 5 |
| | number closest to 5000 |

# SOLVE

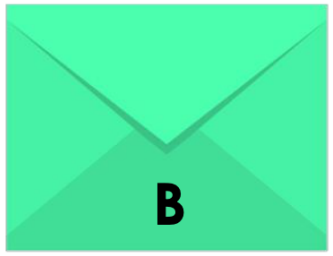
These are challenging, open-ended, investigative tasks designed to really test a pupils understanding of a concept and their ability to apply it to a context beyond a simple single-answer question. Pupils often have to do multiple cognitive steps to solve these!

**1. Emmett puts Base 10 into envelopes. He gives his friends clues as to what is in each one.**



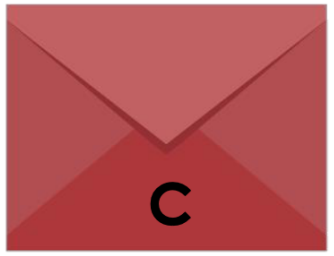

7 pieces

hundreds and tens



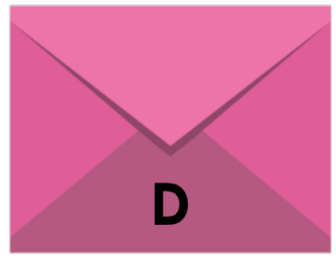

6 pieces

ones and tens




9 pieces

hundreds and ones




7 pieces

ones, tens and hundreds

**Investigate the possible value of each envelope. Find as many possibilities as you can.**

**Using your findings, discuss which envelope is the most valuable. Explain your answer.**

# Moving through concrete, pictorial and abstract (CPA)

## What is the Concrete Pictorial Abstract in Maths?

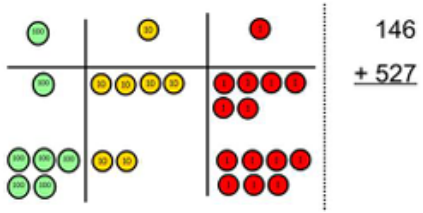
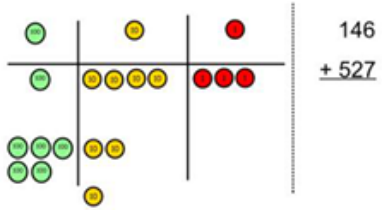
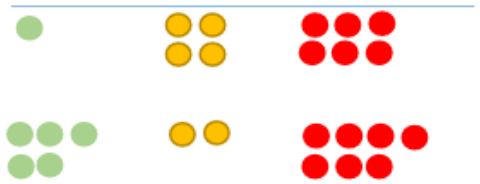
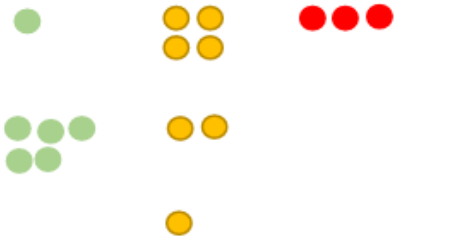
The Concrete Pictorial Abstract (CPA) approach is a system of learning that uses physical and visual aids to build a child's understanding of abstract topics.

Pupils are introduced to a new mathematical concept through the use of concrete resources (e.g. fruit, Dienes blocks etc). When they are comfortable solving problems with physical aids, they are given problems with pictures – usually pictorial representations of the concrete objects they were using.

Then they are asked to solve problems where they only have the abstract i.e. numbers or other symbols. Building these steps across a lesson can help pupils better understand the relationship between numbers and the real world, and therefore helps secure their understanding of the mathematical concept they are learning.

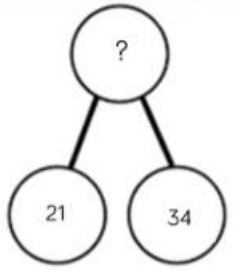
We move through these representations as part of the show section of teaching. Children are then exposed to all three during the do, think, explore and solve.

# Concrete, pictorial and abstract example

| | Objective | Concrete | Pictorial | Abstract |
|---|---|---|---|---|
| Year 3/4 | Column method with regrouping | Make both numbers on a place value grid.<br>  <br>146<br>+ 527<br>Add up the units and exchange 10 ones for 1 ten.<br>  <br>146<br>+ 527<br>As children move on to decimals, money and decimal place value counters can be used to support learning.<br><br>**NB** By Year 4 children will progress on to adding four digit numbers. | 100s 10s 1s<br>  <br>100s 10s 1s<br>  <br>Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding.<br><br>**NB** Addition of money needs to have £ and p added separately. | 100 + 40 + 6<br>500 + 20 + 7<br>600 + 70 + 3 = 673<br><br>As the children progress, they will move from the expanded to the compacted method.<br><br>146<br>+ 527<br>673<br>1<br><br>As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here. |

# Variation (conceptual) – what something is and what it isn't

## Conceptual variation; different ways to ask children to solve 21 + 34




| ? | |
|---|---|
| 21 | 34 |

Word problems:
In year 3, there are 21 children and in year 4, there are 34 children.
How many children in total?

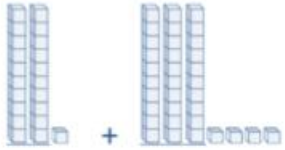
21 + 34 = 55. Prove it

21
+34
___

21 + 34 =

☐ = 21 + 34

Calculate the sum of twenty-one and thirty-four.



Missing digit problems:

| 10s | 1s |
|---|---|
| 🪙🪙 | 1 |
| 🪙🪙🪙 | ? |
| ? | 5 |

# What is my child taught? What are the age related expectations?

| Maths – End of Year 4 Expectations | |
|---|---|
| **New National Curriculum Objectives** | |
| Number and Place Value | count backwards through zero to include negative numbers |
| | count in multiples of 6, 7, 9, 25 and 1 000 |
| | find 1 000 more or less than a given number |
| | order and compare numbers beyond 1 000 |
| | compare numbers with the same number of decimal places up to two decimal places |
| | identify, represent and estimate numbers using different representations |
| | read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value. |
| | recognise the place value of each digit in a four-digit number ( |
| | find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths |
| | round any number to the nearest 10, 100 or 1 000 |
| | round decimals with one decimal place to the nearest whole number |
| | solve number and practical problems that involve all of the above and with increasingly large positive numbers |
| Addition and Subtraction | add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate |
| | estimate and use inverse operations to check answers to a calculation |
| | solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why |
| Multiplication and Division | recall multiplication and division facts for multiplication tables up to 12 × 12 |
| | multiply two-digit and three-digit numbers by a one digit number using formal written layout |
| | use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers |
| | recognise and use factor pairs and commutativity in mental calculations |
| | solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects |
| Fractions, decimals and Percentages | count up and down in hundredths |
| | recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten |
| | compare numbers with the same number of decimal places up to two decimal places |
| | round decimals with one decimal place to the nearest whole number |
| | recognise and show, using diagrams, families of common equivalent fractions |
| | recognise and write decimal equivalents of any number of tenths or hundredths |
| | recognise fraction and decimal equivalence ¼ , ½ , ¾ |
| | add and subtract fractions with the same denominator |
| | find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths |
| Problem Solving | solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number |
| | solve simple measure and money problems involving fractions and decimals to two decimal places. |
| Algebra | Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit. |

| | |
|---|---|
| Measurement and Time | estimate, compare and calculate different measures, including money in pounds and pence |
| | measure and calculate the **perimeter** of a rectilinear figure |
| | find the area of rectilinear shapes by counting squares |
| | read, write and convert time between analogue and digital 12 and 24-hour clocks |
| | solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days |
| | convert between different units of measure (e.g. kilometre to metre; hour to minute) |
| | read, write and convert time between analogue and digital 12 and 24-hour clocks |
| Geometry Shape and Position | identify lines of symmetry in 2-D shapes presented in different orientations |
| | complete a simple symmetric figure with respect to a specific line of symmetry |
| | compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes |
| | identify acute and obtuse angles and compare and order angles up to two right angles by size |
| | describe positions on a 2-D grid as coordinates in the first quadrant |
| | describe movements between positions as translations of a given unit to the left/right and up/down |
| | plot specified points and draw sides to complete a given polygon |
| Statistics | interpret and present data using bar charts, pictograms and tables |
| | solve one-step and two step questions [e.g. 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables. |

http://www.kingsleycp.cheshire.sch.uk/serve_file/88875

# Mental Maths

- A key focus at Highwood this year: mental maths time tables 4 times a week with an new school approach
- Sessions dedicated to mental arithmetic
- Building fluency and speed
- Continuous recall of the 4 operations
- Times table check at the end of Y4 – pupils need to answer multiplication questions up to 12 x 12.

By the end of Year 4, children will be expected to know all of their times tables up to 12 x 12 by heart. This means not only recalling them in order but also being able to answer any times table question at random, and also knowing the related division facts. For example, in knowing that 6 x 8 = 48, children can also know the related facts that 8 x 6 = 48 and that 48 ÷ 6 = 8 and 48 ÷ 8 = 6. This expertise will be particularly useful when solving larger problems and working with fractions.

| | | | | | |
|---|---|---|---|---|---|
| Year 4<br><br>10:45-11:15am | **(5 mins)**<br>Timetable booklet for focus times table and marking<br><br>**(20 mins)**<br>Daily 10/ fast 10 arithmetic<br>Go through answers and address any misconceptions | **(5 mins)**<br>Timetable booklet for focus times table and marking<br><br>**(20 mins)**<br>Exploring 3, 6, 9 and 7 tables/ introduction of times table with number stick<br>Teaching of one key fact per day from key times table focus e.g. 4 x 2 | **French** | **(5 mins)**<br>Timetable booklet for focus times table and marking<br><br>**(20 mins)**<br>Exploring 3, 6, 9 and 7 tables/ introduction of times table with number stick<br>Teaching of one key fact per day from key times table focus e.g. 4 x 2 | **(5 mins)**<br>Timetable booklet for focus times table and marking<br><br>Use of Sumdog/ TTRS to assess and find key facts<br><br>TIMES TABLES ROCK STARS |

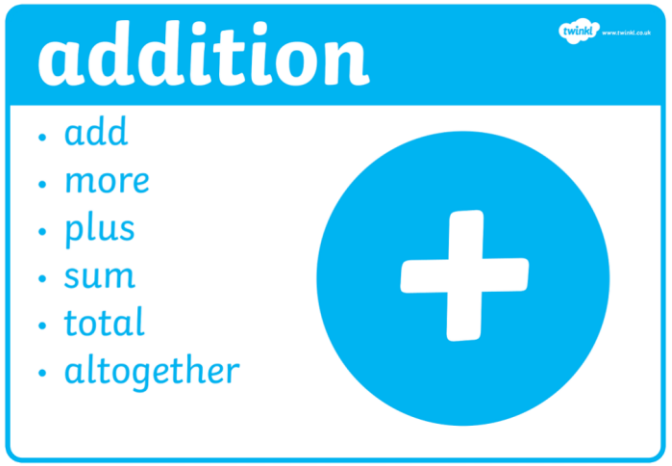
# Mathematical language – place value

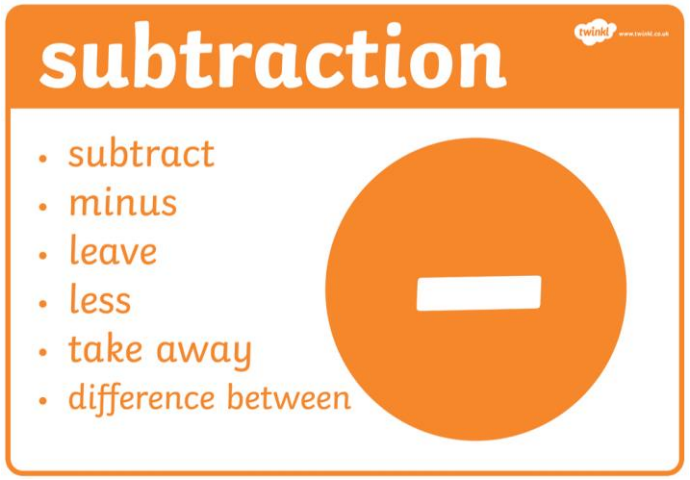
Place value is crucial throughout all arenas of the maths curriculum. It is the value of each digit e.g. 582 is made up of 5 hundreds (500) 8 tens (80) and 2 ones (2)

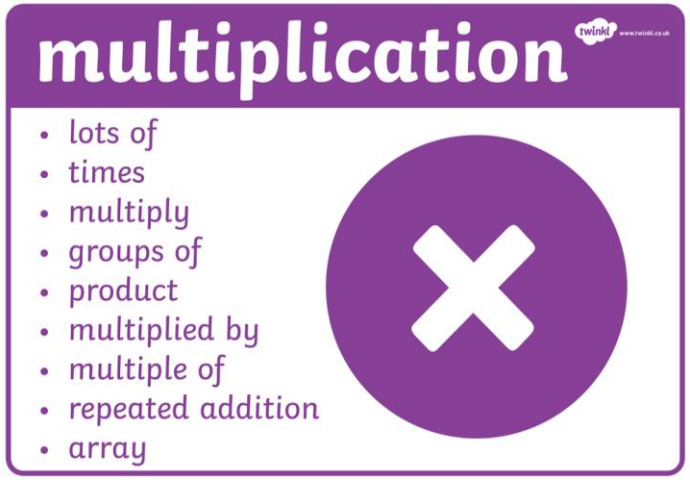
- Importance of saying ones and not units
- Decimal points never move
- Understanding that each value is x10 more/ less

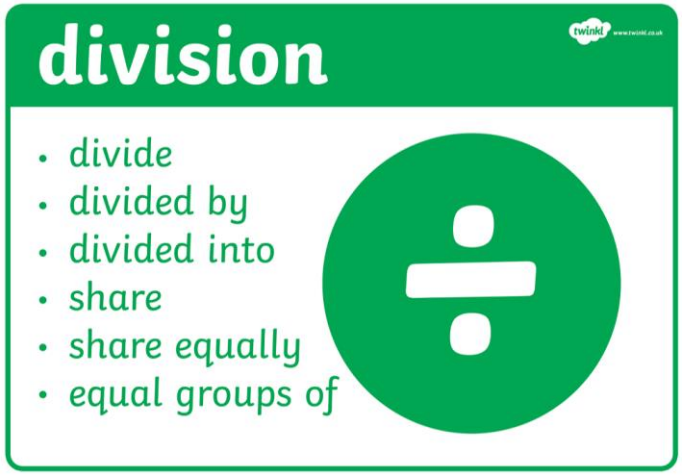
| Tth | Th | H | T | O | t | h |
|---|---|---|---|---|---|---|
| Ten Thousands | Thousands | Hundreds | Tens | Ones | Tenths | Hundredths |
| 10 000 | 1000 | 100 | 10 | 1 | 0.1 $\frac{1}{10}$ | 0.01 $\frac{1}{100}$ |
| | | | | | | |

# Mathematical language – 4 operations



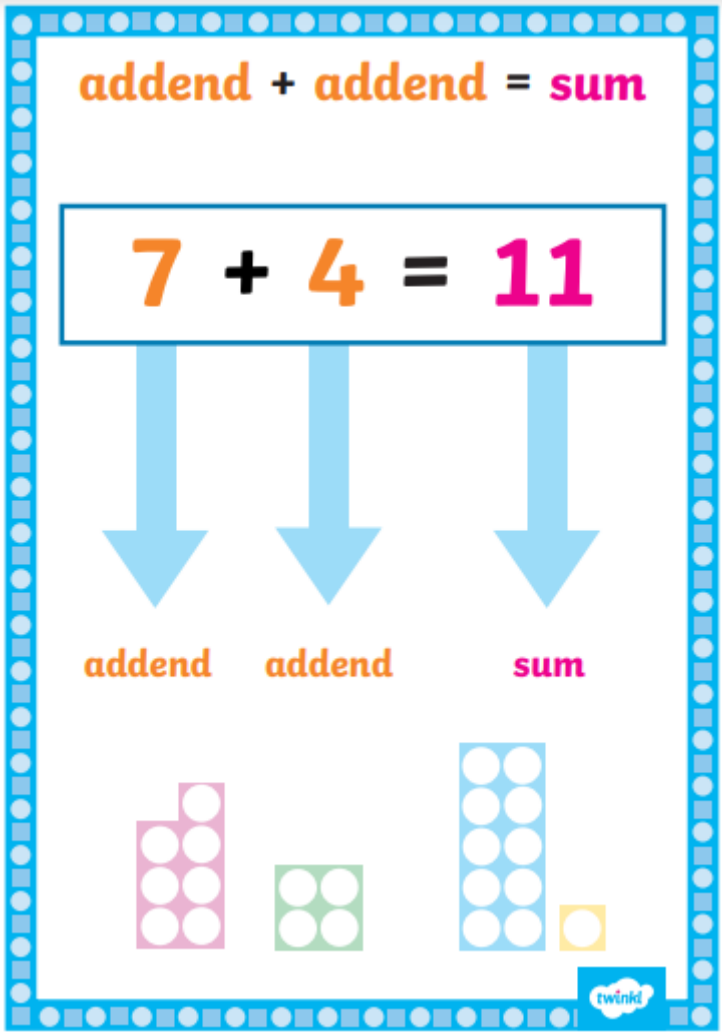



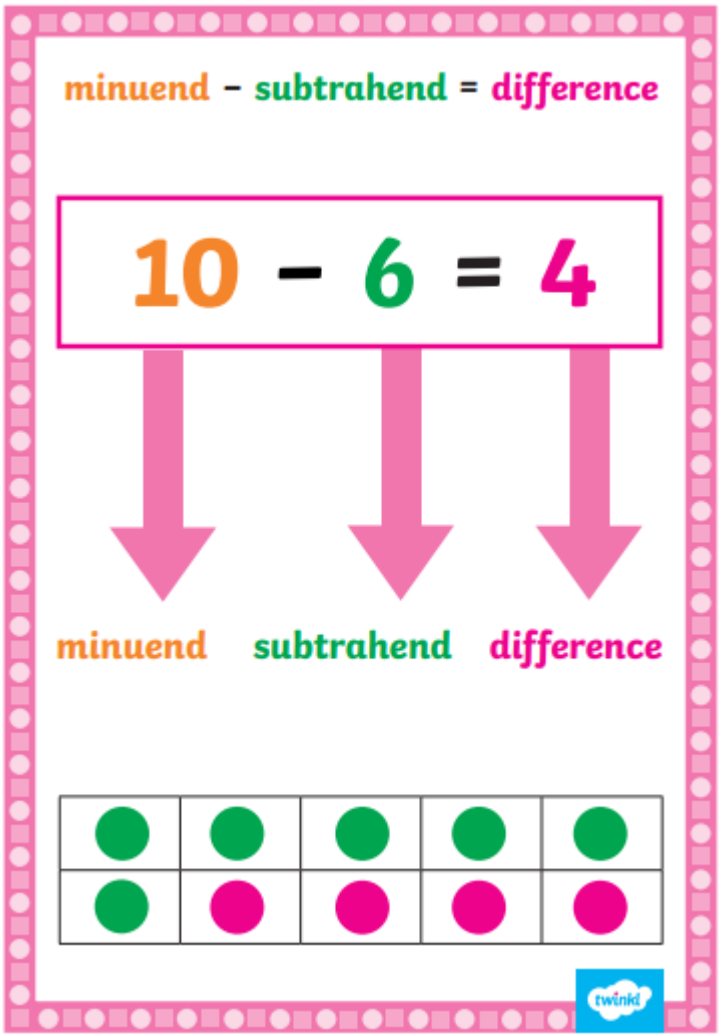



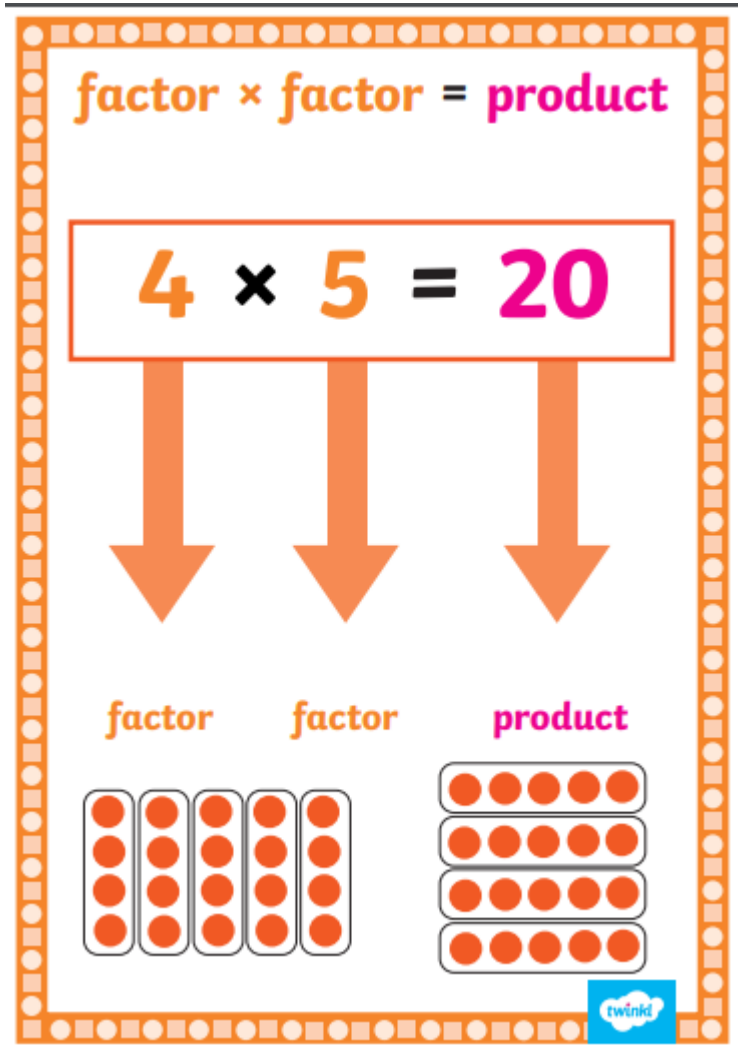

- Not using sum for calculation. Sum means add!

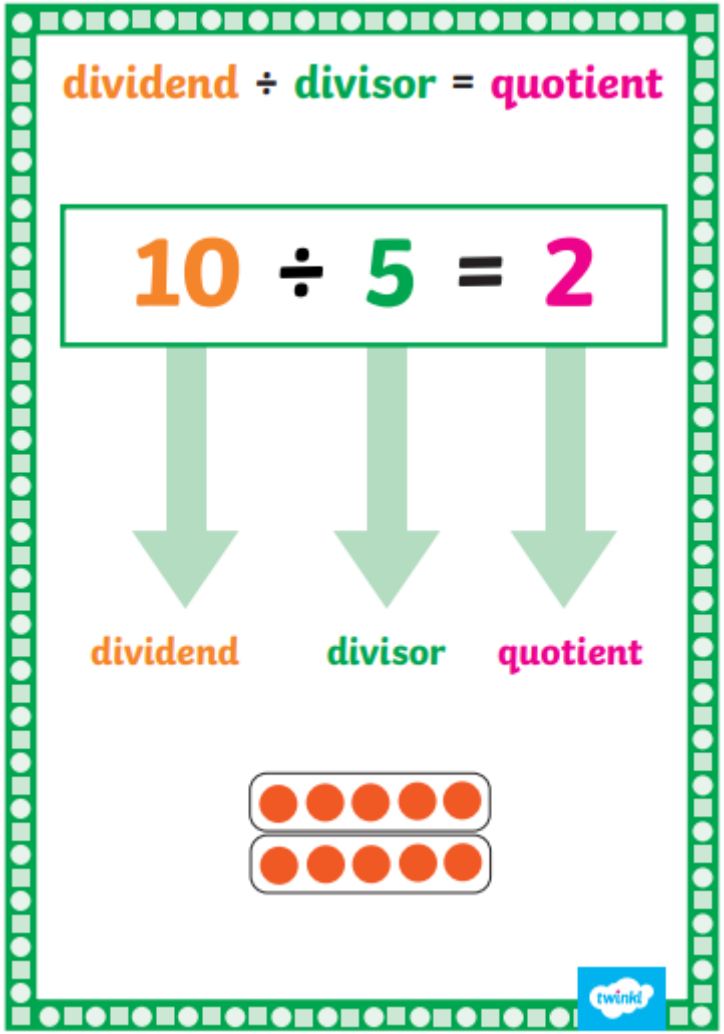
# Mathematical language



# Mathematical language



# How to help at home

- Times table practice (up to 12 x 12)
- The four operations in the real world e.g. shopping, when budgeting, saving money, getting discounts at sales…
- Recall number bonds to 100 (99+1, 27+73, 17+83)
- Using the maths booklets/ information from maths newsletter
- Using Sumdog/ TTRS
- Always practice telling the time!