

# Progression of skills





division



At Portswood Primary Academy Trust, we strive for achievement for all our pupils and believe that all pupils should develop a passion for maths.

We want pupils to be *confident* in their use of maths; being able to *identify* where the *maths* is *in* the *problems* they are *faced* with, to prepare them for its use in the *real world* and to ensure that they are ready for the *next stage* of their *mathematics education*.

Our *aims* for maths, *reflect* the aims of the *National Curriculum*. Pupils should:

- •Become *fluent* in the fundamentals of Maths
- •Reason mathematically
- •Solve problems

Pupils, at Portswood Primary School, should have a *secure knowledge of mathematical facts* and be able to *recall* them *rapidly.* Ensuring that pupils *retain* a *knowledge* of number, other mathematical facts or the processes of calculation, will mean they are *not a barrier to use in wider mathematics.* 

Maths teaching should be supported by using a *concrete, pictorial, abstract* approach.



This allows for *secure retention* of key mathematical concepts. *Manipulative resources* should be available until a pupil is confident working with abstract concepts. They may be returned to at any time.

Year 1



- share objects into twos, fives and tens
- use objects to solve one step division problems
- use pictures to solve one step division problems
- use arrays.

### Additional support

To support our children we use **concrete apparatus** by moving objects into sharing circles. We focus on sharing equally between 2.

#### Core methods

In Year 1 we begin with a **concrete** approach of dividing objects into sharing circles. We focus on sharing in 2s, 5s and 10s. We then progress into a **pictorial** approach of drawing our own arrays.

#### Beyond expectations

To challenge our higher attaining children, we move onto drawing our own sharing circles with a focus on larger numbers.

sharing

equal fair same dividing sharing circles





### Children's work















- solve division sums for the 2, 5 and 10 times tables.
- solve division problems using objects
- solve division problems using sharing circles
- solve multiplication problems using mental methods

### Additional support

To support our children we use **concrete apparatus** with sharing objects. We then use scaffolded number sentences that provide **pictorial** sharing circles.

#### Core methods

In Year 2 we develop on Year 1's method of **pictorial** sharing circles. We provide number sentences for children to draw sharing circles to equally share. Follow the steps on the next page to see how we present our working out!

#### Beyond expectations

To challenge our higher attaining children we answer larger numbers, as well as answering reasoning and word problems.



Year 2





#### 1. Write number sentence



2. Draw your sharing circles



3. Equally share your total into the sharing circles



4. Count the ones shared in one sharing circle (/ cross off when counting)



Year 2



Children's work











- solve division calculations for the 3, 4 and 8 times tables.
- write division calculations, including two digit numbers ÷ one digit numbers
- use mental maths to solve division calculations
- to use formal written methods for division calculations.

### Additional support

To support our lower attaining children we use **concrete apparatus** with using objects to move objects into sharing circles. We then progress onto **pictorial** sharing circles and using place value counters.

#### Core methods

In Year 3 we progress into **abstract** methods. We first introduce the place value table to divide numbers and then progress onto exchanging numbers.

#### Beyond expectations

To challenge our higher attaining children we solve 3 digit ÷ 1 digit questions. We also have a focus on extended range of times tables, such as our 6, 7 and 9 times tables.

divide share half place value counters and table

- Year 3 Steps
  - 1. Write number sentence

84:4=

- 2. Draw place value table including the tens and ones column (The divisor tell you the number of rows to draw)
- Draw the number of tens and ones underneath the place value grid

row in the tens column. (Crossing the tens off as you go)

7. Find the total of each row (Check they are all equal)

6. Repeat with ones

10 66 Ones





Ones

(0)









 $Y_{ear} 3$ Steps



1. This method works well with certain number sentences.

Here are some examples:

44÷4 = 44÷2= 63÷3= 84÷2= 86 ÷3= 55÷5 = 66÷3= 28÷2= 26+2= 22÷2= 24÷2= 42÷2= 88÷4= **48÷4**≡ 99÷3≡ 84÷4=

Year 3 Steps



1. Write number sentence



2. Draw place value table including the tens and ones column

(The divisor tell you the number of rows to draw)

Tens	Ones

3. Draw the number of tens and ones underneath the place value grid



4. Share the tens equally in each row in the tens column.(Crossing the tens off as you go)



5. Make sure the tens are shared equally and if there are extras leave them underneath.

7. Exchange the extra tens for ones using the 'Swap Shop Wiggle'

(we used this in Year 2)



#### 8. Share all the ones and find the total of each row

(don't forget to share the original ones)

(Crossing the ones off as you go)

Tens Ones	
000 00000	= 2 6
000000	=26
88665	ପ୍ରତାହ ବ ବ ବ ବ ବ ବ ବ ବ

 $Y_{ear} 3$ 



### Children's work









- solve division calculations for all the times tables up to 12 x12.
- use place value to divide mentally
- use division facts to solve mental calculations
- use formal written methods including short division

### Additional support

To support our lower attaining children we provide concrete apparatus of counters to share with. We then progress onto pictorial sharing circles and repeated subtraction on a number line.

#### Core methods

In Year 4 we use abstract methods of vertical chunking which progresses into short division. Follow the steps on the next page to see how we present our working out!

#### Beyond expectations

To challenge our higher attaining children we apply short division with word problems and problem solving.

share divide by divided into remainders chunking

'bus stop'





#### Vertical chunking

1. Write number sentence and write in 'bus stop' method





2. Use known multiplication facts to work out the sum

(start with larger calculations, such as 10x or 12x where possible)



Record your multiplication next to the bus stop.

3. Take away your multiplication from your given number



4. Use a known multiplication fact to take away from the remaining number

(if the number is larger, repeat using larger calculations to make the total smaller0



5. Take away your multiplication and add the multiplications you have used to work out the answer



Circle your added multiplications when adding up





1. Write number sentence and write in 'bus stop' method





2. See how many groups of your division you can get from your largest place value

(e.g. how many 3s are in 3 – as 30 is the largest place value)



Record your number above in the bus stop.

3. See how many groups of your division you can get from your next place value

(e.g. how many 3s are in 9 – as 9 is the next place value)







### Children's work















- divide numbers up to 4 digits by 1 digit using a formal written method of short division
- understand and use remainders
- divide whole numbers and decimals by 10/ 100/ 1000
- solve division problems using mathematical knowledge, including factors, multiples, squared and cubed

### Additional support

To support our lower attaining children, we progress on Year 4's 'bus stop' method with **concrete** apparatus of Numicon.

### Core methods

In Year 5 we continue the end of Year 4's **abstract short division (bus stop)** with a focus on larger numbers. We introduce dividing 4 digits  $\div$  1 digit.

#### Beyond expectations

To challenge our higher attaining children we focus on questions that introduce remainders as decimals and fractions.

divisor divided share carry equal groups lots of remainder decimal remainder fraction remainder

Year 5



# Steps

1. Write number sentence in 'bus stop' method.





2. See how many groups of your divisor you can get from your largest place value

(e.g. how many 6s are in 1- as 1000 is the largest place value)



If your number can not go into the place value, exchange over to the next column. E.g. 6 does not go into 1, cross out and exchange to the next value (2 becomes 12)

3. See how many groups of your divisor you can get from your next place value

(e.g. how many 6s are in 12 - as 1,200 is the next place value)



4. Repeat this method until you have completed the calculation







## Year 5 Children's work













- divide numbers up to 4 digits by a 2 digit whole number using long division
- understand and use remainders as whole numbers, fractions and by rounding
- use BODMAS (can also be referred to as BIDMAS) to solve calculations
- use estimation to check answers to calculations and accuracy

#### Additional support

To support our lower children we use **concrete apparatus** such as Numicon. We also introduce bar modelling.

### Core methods

In Year 6 we progress from Year 5's **abstract 'short division'** into chunking of larger numbers. Similar to Year 3's method but with a focus on larger numbers, such as 4 digits divided by 2 digits. We also focus on converting remainders from fractions to decimals.

#### Beyond expectations

To challenge our higher attaining children, we introduce the 'drop down method' to progress from chunking. We also encourage estimating answers before calculating.

> chunking drop-down BODMAS remainder estimation decimal places inverse





Steps

#### 1. Write number sentence in chunking 'bus stop'



### 2. Write down related multiplication facts to support.

(related multiplication facts to help -x1, x10, x100 - doubles)



Use your related multiplication facts to take away.

Repeat until you have nothing left







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