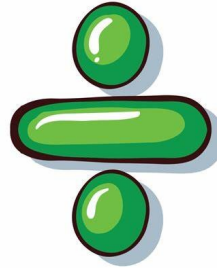# Chad Vale Primary School
Calculation Policy
Division

Children are encouraged to develop their understanding of mathematics using the CPA approach (*Concrete - Pictorial - Abstract*).

At Chad Vale, we feel that it is important that the abstract method is used alongside any *concrete* and *pictorial* representations whenever possible. This is to show children the relationship between both methods. As children progress through the calculation policy, it might be more appropriate for children to start on *pictorial* representations with *concrete* examples used for those who are struggling or need further support.

This document identifies the progression in calculation strategies rather than specifying which method should be taught in a particular year group. Therefore, children should only progress to the next stage when they are ready. The purpose of this policy is to develop understanding. For this reason, in the latter stages where more complex methods are adopted and where children are expected to be competent in certain skills (e.g. number bonds / times-tables), children are encouraged to move straight onto *abstract* methods as *concrete* and *pictorial* representations (e.g. long division) are not appropriate and likely to lead to confusion.

Examples of *varied fluency* are also included in this document which enable children to demonstrate a sound understanding. Teachers should always exercise discretion in their use as adopting new methods, with children who are not secure might again lead to confusion.

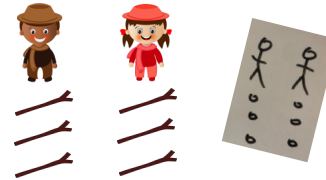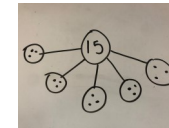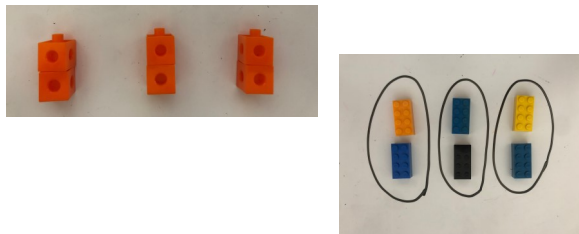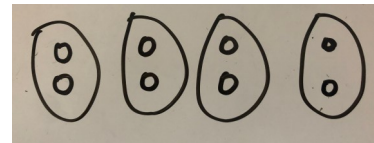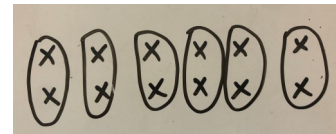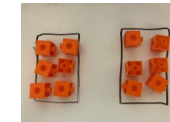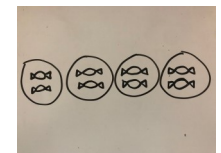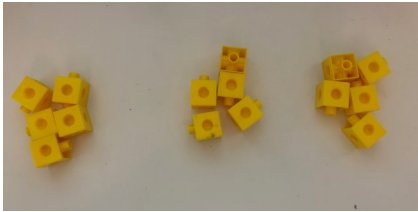|	Concrete	Pictorial	Abstract
Sharing	I have 10 cubes. Can you share them between 2 teddies? Objects are shared out between people, toys or objects.	$6 \div 2 = 3$ $10 \div 5 = 2$ Children move onto sharing using pictures or drawing symbols.	$12 \div 2 = 6$ 15 buns are divided between 5 people. How many buns does each person have? Children use either pictures or objects to help them answer questions or solve problems.
Grouping	6 cubes are divided into groups of 2. How many groups will there be? Divide quantities into equal groups. Children count how many groups there are.	$8 \div 2 = 4$ $12 \div 2 = 6$ Children use drawings to divide quantities into equal groups.	$10 \div 5 = 2$ Divide 8 sweets into groups of 2. Children use either pictures or objects to help them answer questions or solve problems.

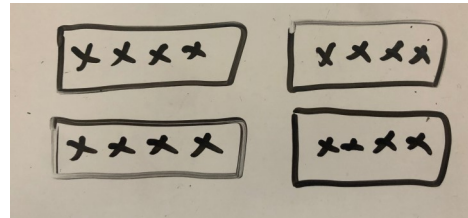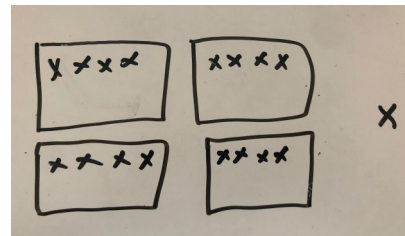|	**Concrete**	**Pictorial**	**Abstract**
Division without remainders (within the 12 times-tables)	15 ÷ 3 = 5 Children use objects to solve division problems.	16 ÷ 4 = 4 Drawings are used to answer questions.	24 ÷ 4 = 6 12 ÷ 3 = 4 18 ÷ 3 = 6 Children begin to use their times-table knowledge to answer division questions.
Division with remainders (within the 12 times-tables)	15 ÷ 4 = 3 r3 The remaining object is left to one side. Children use objects to solve division problems which involve remainders.	17 ÷ 4 = 4 r1 Drawings are used to answer questions.	26 ÷ 4 = 6 r2 13 ÷ 3 = 4 r1 20 ÷ 3 = 6 r2 Children begin to use times-table knowledge to answer division questions.

16 ÷ 2 = 8

20			
?	?	?	?

$20 ÷ 4 =$ __
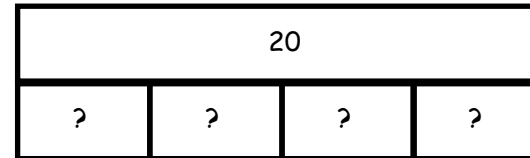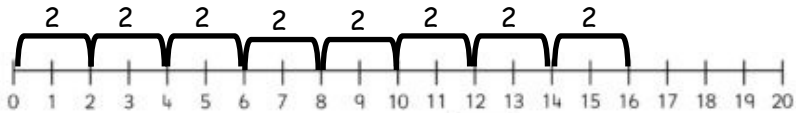
$4 x$ __ $= 20$

Fill in the missing numbers

$18 ÷ ? = 9$
$35 ÷ ? = 7$
$7 x ? = 14$
$? X 4 = 20$

Bob has 12 fish and shares them between his 2 fish tanks.

How many fish does he put in each tank?

Jazz has 18 apples. She puts them into groups of 5.

How many will she have left over if she puts 5 in each group?

How many *more* does she need to fill another bag?

Concrete	Pictorial		Abstract

Short Division (*without* remainders)

Once children know their times-table, they are ready to move onto the formal written methods of short division. In this case, the dividend will considerably larger and the divisor is a single digit number.

$68 \div 4 = 17$ $\qquad$ $724 \div 4 = 181$

$$4 \overline{\smash{)}6\ ^2 8} \quad = 1\ 7$$

$$4 \overline{\smash{)}7\ ^3 2\ 4} \quad = 1\ 8\ 1$$

Children use their times-table knowledge to answer division questions.

Short Division (*with* remainders)

Children should not progress onto this stage until they are confident with their times-tables.

$82 \div 6 = 13\ r4$ $\qquad$ $925 \div 8 = 115\ r3$

$$6 \overline{\smash{)}8\ ^2 2} \quad = 1\ 3\ r4$$

$$8 \overline{\smash{)}9\ ^12\ ^45} \quad = 1\ 1\ 5\ r3$$

$4937 \div 3 = 1312\ r1$

$$3 \overline{\smash{)}4\ 9\ 3\ 7} \quad = 1\ 3\ 1\ 2\ r1$$

Children use their times-table knowledge to answer division questions involving remainders. This can then be extended to answers where the remainder is expressed as a fraction or a decimal.

Concrete

Pictorial

Abstract

PRIMARY
CHAD VALE
SCHOOL

Long Division

Once children know their times-table, they are ready to move onto the formal written methods of short division. In this case, the dividend will considerably larger and the divisor is a single digit number.

Children should not progress onto this stage until they are confident with their times-tables.

$288 \div 12 = 24$

```
        2  4
  1 2 | 2  8  8
     -  2  4  0    (20 x 12)
        _____
        0  4  8
     -  0  4  8    (4 x 12)
        _____
        0  0  0
```

$345 \div 13 = 26\ r7$

```
           2  6
  1 3 | 3  4  5
     -  2  6  0    (20 x 13)
        _____
        0  8  5
     -  0  7  8    (6 x 13)
        _____
        0  0  7
```

Children subtract 'chunks' and use repeated subtraction.

Short Division (with remainders)

$322 \div 14 = 23$

```
          2  3
  1 4 | 3  2  2
     -  2  8
        _____
        4  2
     -     4  2
        _____
        0  0
```

$432 \div 15 = 28\ r12$

```
          2  8
  1 5 | 4  3  2
     -  3  0
        _____
        1  3  2
     -  1  2  0
        _____
        0  1  2
```

Children use formal methods of long division.