

# Chorley, St. Mary's Catholic Primary School



## Policy for Mathematics.

Reviewed and Updated January, 2010

## **Introduction**

This policy reflects the values, beliefs and philosophy of the school community in relation to mathematics. It provides a framework for action within which teaching and non-teaching staff can operate. It should be read in conjunction with its associated scheme of work. It provides guidance so as to ensure continuity in planning and practice.

## **Mission Statement**

St Mary's Catholic primary School is a welcoming Christian community which upholds the values of justice, respect and equality, and promotes enthusiasm for learning. We aim:

- To be a happy Christian community, upholding the values of love, justice and peace;
- To provide an education which enables all children to reach their full potential by enjoying a broad, balanced and inclusive curriculum;
- To nurture a sense of belonging and to welcome and work in partnership with families, the parish and the wider community.

## **Values and Attitudes** – The importance of Mathematics

Mathematics equips pupils with a uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem solving skills, and the ability to think in abstract ways.

Mathematics is important in everyday life, many forms of employment, science and technology, medicine, the economy, the environment and development, and in public decision-making. Different cultures have contributed to the development of mathematics. Today the subject transcends cultural boundaries and its importance is universally recognised. Mathematics is a creative discipline. It can stimulate moments of pleasure and wonder when a child solves a problem for the first time, discovers a more elegant solution to that problem, or suddenly sees hidden connections. We therefore aim to equip children not only with skills but also with confidence and a sense of enjoyment.

**AIMS AND PURPOSES** -Using the programmes of study from the National Curriculum and the National Numeracy Strategy Framework for Teaching Mathematics it is our aim to develop:

- A positive attitude toward mathematics and an awareness of the fascination of mathematics, through practical activity, exploration and discussion
- Competence and confidence in mathematical knowledge, concepts and skills
- Develop skills to use a range of materials and techniques competently

- An ability to solve problems, to reason, to think logically and to work systematically and accurately in a range of contexts
- Initiative and an ability to work both independently and in co-operation with others
- An ability to communicate mathematics
- To understand the importance of mathematics in everyday life
- An ability to use and apply mathematics across the curriculum and in real life
- An understanding of mathematics through a process of enquiry and experiment

## **Knowledge, skills and understanding**

### **Foundation Stage**

#### **Building on the early learning goals**

Pupil's prior experience of mathematics includes:

- Counting and using numbers to at least 10 in familiar contexts
- Recognising numerals 1-9
- Talking about and creating simple patterns
- Beginning to understand addition as combining two groups of objects and subtracting as 'taking away'
- Describing the shape and size of solid and flat shapes
- Using everyday words to describe position
- Using early mathematical ideas to solve practical problems

Pupil progress will be monitored within the Foundation Stage and recorded on the Foundation Stage Profile. This information will be shared with the Head Teacher, Assessment Coordinator and Class 1 teacher at the end of the academic year.

### **Key Stage 1 and 2**

At KS1 and KS2 teachers use the Renewed Framework for Teaching Mathematics to ensure that all parts of the National Curriculum Programme of Study are taught:

- 1) The **Knowledge, skills & understanding** - identify the **Key areas of Mathematics** pupils have to study.
- 2) **The Breadth of study** - identifies contexts, activities, areas of study and range of experiences **through which** the knowledge, skills & understanding should be taught.

The Mathematics curriculum has four attainment targets:

(i) **Using and Applying Mathematics** – Children are taught how to use and apply their mathematical knowledge, skills and understanding. They decide how to tackle problems. They record what they do using mathematical language, symbols and diagrams and explain their reasoning.

(ii) **Number** – This includes numbers and the number system, calculations and ways of solving problems.

(iii) **Shape, Space and Measures** – This includes two- dimensional and three-dimensional shapes, position, movement and measurement.

(iv) **Handling Data** – this includes working out which questions can be answered by collecting data, organising it, putting it into graphs and diagrams and working out how it helps to answer the original questions.

**Key Stage One ‘Programme of Study’ summary** – *pupils develop their knowledge and understanding of mathematics through practical activity, exploration and discussion. They learn to count, read, write and order numbers to 100 and beyond. They develop a range of mental calculation skills and use these confidently in different settings. They learn about shape and space through practical activity which builds on their understanding of their immediate environment. They begin to grasp mathematical language, using it to talk about their methods and explain their reasoning when solving problems.*

**BREADTH OF STUDY** - During Key Stage One, pupils should be taught the Knowledge, skills and understanding through:

- a) practical activity, exploration and discussion
- b) using mathematical ideas in practical activities, then recording these using objects, pictures, diagrams, words, numbers and symbols
- c) using mental images of numbers and their relationships to support the development of mental calculation strategies
- d) estimating, drawing and measuring in a range of practical contexts
- e) drawing inferences from data in practical activities
- f) exploring and using a variety of resources and materials, including ICT
- g) activities that encourage them to make connections between number work and other aspects of their work in mathematics.

**Key Stage Two ‘Programme of Study’ summary** - *pupils use the number system more confidently. They move from counting reliably to calculating fluently with all four number operations. They always try to tackle a problem with mental methods before using any other approach. Pupils explore features of shape and space and develop their measuring skills in a range of contexts. They discuss and present their methods and reasoning using a wider range of mathematical language, diagrams and charts.*

**BREADTH OF STUDY** - During Key Stage Two, pupils should be taught the Knowledge, skills and understanding through:

- a) activities that extend their understanding of the number system to include integers, fractions and decimals
- b) approximating and estimating more systematically in their work in mathematics
- c) using patterns and relationships to explore simple algebraic ideas
- d) applying their measuring skills in a range of contexts
- e) drawing inferences from data in practical activities, and recognising the difference between meaningful and misleading representations of data
- f) exploring and using a variety of resources and materials, including ICT
- g) activities in which pupils decide when the use of calculators is appropriate and then use them effectively
- h) using mathematics in their work in other subjects.

### **Classroom organisation**

Pupils are encouraged to work in a variety of ways in mathematics, these can be through:

- Co-operative group work
- An individual approach
- Class teaching
- Paired work
- Guided group work

Each class teacher is responsible for the mathematics in his or her class in consultation with and with guidance from the mathematics co-ordinator.

The approach to the teaching of mathematics within the school is based on three Key principles:

- A numeracy lesson every day (45-60 minutes)
- A clear focus on direct, instructional teaching and interactive oral work with the whole class and group
- An emphasis on mental calculation

### **Planning**

Planning in mathematics is a process in which all teachers are involved. Our scheme of work is a working document and as such is composed of ongoing plans based on the Renewed Framework and takes into the consideration the needs of our children.

The National Numeracy Strategy Framework for Teaching gives a detailed plan of what we teach in the Long-Term.

Our Medium-Term plans are taken from the Lancashire Mathematics Centre which follow the Renewed Framework. Each class teacher in Key Stage 1 and 2 has been provided with a Mathematics file in which these plans can be found. These files also contain unit overviews which detail objectives, 'I can statements' Speaking and

Listening, Vocabulary and Prior Learning These plans ensure an appropriate balance and distribution of work across each term.

Short term plans are complete by the class teacher. The planning format is available on the school server. Alternatively teachers can use and adapt Abacus plans, which should be annotated to match the needs of the class. These weekly plans list the specific learning objectives for each lesson and give details of how the lessons are to be taught. Plans should show differentiation, Teaching Assistant support and indicate use of ICT. The class teacher keeps these individual plans and they are monitored by the Numeracy Coordinator and Head Teacher each term. Through careful planning and preparation we aim to ensure that throughout the school children are given opportunities for:

- Practical activities and mathematical games
- Problem solving
- Individual, group and whole class discussions and activities
- Open and closed tasks
- A range of calculating e.g. Mental, pencil and paper and using a calculator
- Working with computers as a mathematical tool

### **Cross curricular Mathematics Opportunities**

Teachers seek to take advantage of opportunities to make cross curricular links. They plan for pupils to practice and apply the skills, knowledge and understanding acquired in mathematics lessons to other areas of the curriculum. An example of this is the recording and interpretation of data in science, measurement skills and problem solving in design technology and use of coordinates and direction in geography.

### **Information & Communication Technology**

Pupils should be given opportunities' to apply and develop their ICT capabilities through the use of ICT tools to support their learning in all subjects. Children use and apply mathematics in a variety of ways when solving problems using ICT. Children use it to produce graphs and tables when explaining results or when creating repeating patterns, such as tessellations. When working on control, children use standard and non-standard measures for distance and angle. Interactive whiteboards give teachers an opportunity to use ICT to demonstrate mathematical ideas and involve the children in estimating, predicting and exploring mathematical ideas. A range of mathematics software is available to support teaching and learning.

**Spiritual development** - is concerned with the inner life, and with attempting to make that inner life visible. Mathematics contributes to spiritual development in several ways:

We want pupils to have an awareness of the world around them, to be aware of beauty, pattern and design, to experience moments of awe and wonder and to reflect on those experiences of God's creation. Through observation of patterns in number and in shape and space and in the solving of problems, pupils can come to view the world with greater insight than they might otherwise have. By becoming

visually and numerically aware they may be able to look at the world around them in greater detail.

### **PSHCE**

Mathematics contributes to the teaching of personal, social and health education and citizenship. The work that children do outside their normal lessons encourages independent study and helps them become increasingly responsible for their own learning. The planned activities that children do within the classroom encourage them to work together and respect each other's views. We present children with real-life situations in their work on such things as the spending of money and problem solving.

### **Resources**

All teachers should organise mathematics resources within the classroom so that they are easily accessible to all children. Mathematics working walls are displayed in each classroom. These should contain key vocabulary, number lines or squares, targets, teaching prompts and other useful aids for children to use to support their learning. Other resources are kept in a central location with the Key Stage 2 corridor. Please see the attached resources list.

### **Pupils Records of their work.**

Children are encouraged to record and communicate their mathematics in a variety of ways, and they are encouraged and helped to use the most appropriate and convenient method of recording. There are occasions when it is both quick and convenient to carry out written calculations. It is also important to record aspects of mathematical investigations. The appendix to this policy details the methods of written calculations that the staff have decided are best suited to the children in our school. Parents have been made aware of these methods of calculation through an after school workshop and through a booklet for parents.

### **Assessment, Recording and Reporting**

Assessment is a continuous process that should be varied and appropriate. It should be built into teaching as an integral part of teaching and learning. It should be used to plan and improve future work, for example, to adjust aspects that are too easy or too challenging. An important way of assessing progress is by observation and discussion with the pupil. Teachers will often give informal tests of mental arithmetic, and the results of these will be discussed with the children.

The use of Assessing Pupils Progress (APP) will enable the class teacher to identify strengths and gaps in learning. Planning can then be adapted to ensure that pupils are making good progress. Pupil progress meetings are held each term, with the head Teacher, in order to update the Pupil Tracker and identify children who may benefit from additional support. At the end of each half term children may be assessed more formally based on the units within the framework that the children have been studying. This will enable teachers to monitor a child's attainment against key objectives. Abacus Assessment resources can be used for this purpose. Assessment records are

discussed, and are passed on to the next class teacher at the end of the academic year.

National statutory testing in mathematics takes place in Yr 2 and Yr 6, and children in Yr's 3, 4, and 5 take Optional tests. The annual report to parents is completed before the end of the summer term and parents are given the opportunity to discuss progress on three separate occasions. These reports contain a Numeracy target for the child, which will be carried through to the next academic year.

## **Differentiation**

This should always be incorporated into all mathematics lessons and can be achieved in various ways:

- **Stepped Activities**, which become more difficult and demanding but cater for the less able in the early sections.
- **Common tasks**, which are open-ended activities/investigations where differentiation is by outcome.
- **Resourcing** which provides a variety of resources depending on abilities e.g. Counters, cubes, 100 squares, number lines, mirrors.
- **Grouping** according to ability so that the groups can be given different tasks when appropriate. Activities are based on the same theme and usually at no more than three levels

## **Inclusion**

We aim to provide for all pupils so that they achieve their full potential in mathematics according to their individual abilities. As such, all pupils receive carefully differentiated, high quality mathematics teaching as a first wave of support.

In addition, where identified pupils are considered to require targeted support to enable them to work towards age appropriate objectives, Intervention programmes are implemented as a second wave of support. The following intervention programmes are currently used at St Mary's: Springboard 3, 4 and 5, Booster Groups in Year 6 and 1:1 tuition. Teacher's and Teaching Assistant plan and deliver the intervention programmes together, closely monitoring the progress of pupils.

There is a third wave of support for pupils who are on the 'School Action' or School Action Plus' stages of the Special Educational Needs Record for mathematics related learning difficulties. This support is additional and different; specific details of provision are detailed on pupils individual Education Plans.

Suitable, differentiated learning challenges for more able pupils- who are identified on the school Able, Gifted and Talented Register- are planned for in line with the school's Able Gifted and Talented Policy.

## **Equal Opportunities**

It is the responsibility of all teachers to ensure that all pupils, irrespective of gender, ability; including gifted pupils, ethnicity and social circumstance, have access to the mathematics curriculum and make the greatest possible progress.

## **Disability Discrimination Act**

The Disability Discrimination Act (1885, 2005) requires schools to promote equality of opportunity for all pupils. We endeavour to meet this duty through the implementation of the school's Disability Equality Scheme Action Plan which forms part of the Disability Equality Scheme (DES) and the School Accessibility Plan, which aims to reduce and eliminate barriers to access the curriculum and to full participation in our school community for our pupils and prospective pupils.

In Mathematics we aim to do this by:

- Ensuring disabled pupils can participate in and take full advantage of the Mathematics curriculum;
- Improving the delivery of information to disabled pupils, for example photocopying resources on coloured paper where a pupil has dyslexia;
- providing training for staff e.g. on supporting pupils with speech, language and communication difficulties (Inclusion Development Plan 2008).

The effectiveness of our policy and practice on the educational opportunities available to and achievements of disabled pupils is reviewed annually by the school's governing body.

## **Parent Carer and Community Involvement**

At St Mary's, we value the involvement of parents/carers in their child's development. We promote home school partnership in the following ways:

- Sharing information – e.g. newsletters, open evening, parents leaflets, individual target information, curriculum overviews;
- Inviting them to take part in parent/pupil workshops and meetings
- Setting homework in line with our Homework Policy and Home/School Agreement

Parents are welcome into the school to support children. Guidance is provided by the teacher in line with our policy for volunteers in school.

As a primary feeder school for Holy Cross High School we liaise with the Year 7 Head of Year in order to ensure a smooth transition from Key Stage 2 to Key Stage 3 for pupils with a place at the school.

Our successful Mathematics Week ( Autumn 2009) is to be repeated. This involved a visiting 'Mathemagician' and a wide variety of mathematical activities, including a successful pupil/parent lesson/workshop in two classes. Positive feedback from this has resulted in this becoming extended to other classes throughout the year. We hope that this will continue to raise the profile of mathematics and further help parents to support their children at home.

### **Homework**

It is our school policy to provide parents and carers with opportunities to work with their children at home. These activities may only be brief, but are valuable in promoting children's learning in mathematics.

Activities are sent home on a regular basis (see the separate school Homework Policy) and take the form of number games and tasks with some formal exercises for the older children. These activities will reinforce work carried out in the classroom and may prepare them for future lessons.

### **Monitoring and Evaluation**

Monitoring of the standards of children's work and the quality of teaching in mathematics is the responsibility of the Mathematics Subject Leader and the Head Teacher. The work of the mathematics subject leader also involves supporting colleagues in the teaching of mathematics, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school. The mathematics subject leader is responsible for evaluating strengths and weaknesses in the subject and reporting on areas for further improvement. The Head teacher allocates monitoring time to the mathematics subject leader so the he/she can review teacher's planning, samples of children's work, undertake lesson observations of mathematics teaching across the school and carry out pupil interviews. A named member of the school's governing body is briefed to oversee the teaching of numeracy.

### **Governing Body**

Regular Mathematics reports are made to the governors via the school's Mathematics governor. The mathematics Subject Leader prepares an annual report for the Mathematics governor.

### **Conclusion**

Please refer to other school policies and documentation related to this policy, including:

- Teaching and learning policy
- Early Years policy
- Assessment, recording and reporting policy
- Feedback and marking policy
- Special Educational Needs policy

- Able, Gifted and Talented policy
- ICT policy
- Equal Opportunities policy
- Health and Safety policy
- Homework policy
- Disability Equality Scheme & Action Plan
- Home-School Agreement

### **Accessibility**

The Mathematics policy has been produced in a dyslexia friendly font and size (Arial, font size 12). It is available to stakeholders, including parents, via the school website. Upon request to the school office, the policy can be viewed within school and can also be made available in the following formats: email as a PDF or Word attachment, on coloured paper and as an enlarged print version.

### **Review Date**

This mathematics policy will be reviewed annually. The mathematics subject leader will monitor and review policy. The next review will be February 2011.

## **Progression Through Written Calculations Policy**

### **Aim**

The aim should be that by the end of Year 6 children will have been taught, and be secure with, a compact standard method for each operation. Children will progress at different rates towards these compact standard methods.

Children develop understanding at different rates so it is to be expected that, at any time, in any class, there will be children working at expanded forms of the same method, at a range of levels of efficiency and understanding.

They need to be guided appropriately towards increased efficiency in their writing and to less dependence on informal jottings.

### **Stages in Recording Calculations**

- Developing the use of pictures and a mixture of words and symbols to represent numerical activities;
- Use of standard symbols and conventions, such as numerals 0 to 9, the equals sign and the operations signs to record mental calculations
- Use of jottings to aid mental strategy;
- Use of expanded forms of recording as a step towards standard pencil and paper methods
- Use of compact forms of recording;

Jottings should be discarded when a child has a secure understanding of a mental method.

In order to ensure progression in written calculations the following methods of calculation are to be used consistently throughout the school, appropriate to the age and ability of the child.

## **Addition**

### Mental Calculations ( ongoing)

These are a **selection** of mental calculation strategies

#### **Mental recall of number bonds**

$$6 + 4 =$$

$$25 + 75 =$$

#### **Use near doubles**

$$6 + 7 = \text{double } 6 + 1 = 13$$

#### **Addition using partitioning**

$$35 + 45 = (30 + 40) + (4 + 5) = 79$$

### Counting on

$$86 + 57 = 86 + 50 + 7 = 143$$

### Add the nearest multiple of 10, 100 and 1000 and adjust

$$13 + 9 = 13 + 10 - 1 =$$

$$24 + 19 = 24 + 20 - 1 = 43$$

$$458 + 71 = 458 + 70 + 1 =$$

Many mental calculation strategies will continue to be used. They are not replaced by written methods.

### INFORMAL STANDARD WRITTEN METHODS

Use informal pencil and paper methods (jottings) to support and explain partial mental methods building on existing mental strategies.

1) Counting on using a number line

$$43 + 58 =$$

$$+50$$

$$+8$$

$$43 \quad \quad \quad 93 \quad \quad \quad 101$$

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NNS Section 5 page 43

END OF YEAR 3

### 2) Adding the most significant digits first

$$67 + 24 = (60 + 20) + (7 + 4) =$$

$$80 + 11 =$$

$$91$$

### 3) Vertical layout

Adding the least significant digits first

$$67$$

$$267$$

+ 24	85
11 (7 + 4)	12 (7 + )
80 (60 + 20)	140 ( 60 + 80)
91	200
	352

END OF YEAR 4

3) Vertical layout

Adding the least significant digits first in preparation for carrying.

$$\begin{array}{r}
 358 \\
 + 73 \\
 11 \quad (8 + 3) \\
 120 \quad (50 + 70) \\
 300 \\
 431
 \end{array}$$

leading to:

$$\begin{array}{r}
 358 \\
 + 73 \\
 431
 \end{array}$$

END OF YEAR 5

4) extend to decimals

By the end of year 6, children will have a range of calculation methods. Selection will depend on the numbers and problems involved.

Children should not be made to go onto the next stage if they are not ready or not confident. However some children will grasp one method more easily than another.

Children should be encouraged to approximate their answers before calculating. Children should be encouraged to consider if a mental method would be appropriate before using written methods.

**PROGRESSION OF CALCULATION FOR SUBTRACTION**

1) Mental recall of number bonds

Children should be familiar with equations with different missing digits.



e.g.  $6 + 7 = 13$

NNS section 5 page 36-41

### INFORMAL TO STANDARD WRITTEN METHODS

Use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

#### 2) **Counting up from the smaller number to the larger number, using a number line.**

e.g.  $84 - 56$        $56 + 4 + 20 + 4 = 84$

$$4 + 20 + 4 = 28$$

NNS section 5 page 45

### END OF YEAR 3

**This strategy will continue to be used when one of the numbers is close to the tens, hundreds or thousands boundary e.g.  $30000 - 1997 =$**

#### 3) **Partitioning and decomposition**

e.g.  $563 - 241$

$$\begin{array}{r} 500 + 60 + 3 \\ -200 + 40 + 1 \\ \hline 300 + 20 + 2 = 322 \end{array}$$

NNS Section 5 page 45; Section 6 page 50 – 51

### END OF YEAR 4

#### 4) **Partitioning and decomposition leading to exchanging one ten for ten units**

e.g.  $563 - 248$

$$\begin{array}{r} 50 \\ 500 + 60 + 3 \\ -200 + 40 + 8 \\ 300 + 10 + 5 \end{array} = 315$$

**When children** are secure with this method, the calculation can be compacted into the form:

$$\begin{array}{r} 5 \\ 563 \\ -248 \\ 315 \end{array}$$

## **END OF YEAR 5**

### **5) Extend to decimals**

**Children should not be made to go on to the next stage if they are not ready and/or if they are not confident.**

Children should be encouraged to approximate their answers before calculating. Children should be encouraged to consider if a mental calculation would be appropriate before using a written method.

## **PROGRESSION OF CALCULATION FOR MULTIPLICATION**

### **MENTAL CALCULATION (ongoing)**

## 1) Doubling and halving

## 2) Using multiplication and division facts

Year 2 – 2 times tables  
10 times tables  
Begin to know 5 times tables  
Derive quickly the corresponding division facts.

Year 3 – 2 times tables  
5 times tables  
10 times tables  
Begin to know 3 and 4 times tables  
Derive quickly the corresponding division facts.

Year 4 - 2 times tables  
3 times tables  
4 times tables  
5 times tables  
10 times tables  
Begin to know 6, 7, 8 and 9 times tables.

Year 5 and 6 -Know by heart all multiplication facts up to 10 x 10 and derive quickly the corresponding division facts.

**MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED. THEY ARE NOT REPLACED BY WRITTEN METHODS.**

### **INFORMAL TO STANDARD WRITTEN METHODS**

Use informal pencil and paper methods ( jottings) to support, record and explain partial mental methods building on existing mental strategies.

#### 1) Repeated addition

e.g.  $5 + 5 + 5 = 3$  lots of 5 or  $3 \times 5$

NNS Section 5 page 47

#### 2) Describing an array

$$2 \times 4 = 8$$

### 3) Partitioning

$$\begin{aligned} \text{e.g. } 38 \times 7 &= (30 \times 7) + (8 \times 7) \\ &= 210 + 56 \\ &= 266 \end{aligned}$$

### 4) Grid layout

e.g.  $38 \times 7$

$$\begin{array}{r} \times \quad 30 \quad \quad 8 \\ 7 \quad \boxed{\phantom{00}} \quad \boxed{\phantom{00}} \end{array}$$

Extend to HTU x TU

e.g.  $346 \times 9$

$$\begin{array}{r} \times \quad 300 \quad \quad 40 \quad \quad 60 \\ 9 \quad \boxed{\phantom{000}} \quad \boxed{\phantom{000}} \quad \boxed{\phantom{000}} \end{array}$$

### END OF YEAR 4

Extend to TU x TU

e.g.  $72 \times 38$

$$\begin{array}{r} \times \quad 70 \quad \quad 2 \\ 30 \quad \boxed{\phantom{00}} \quad \boxed{\phantom{00}} \\ 8 \quad \boxed{\phantom{00}} \quad \boxed{\phantom{00}} \end{array}$$

### END OF YEAR 5

Extend to HTU x TU or decimals

e.g.  $23.5 \times 12$

x	20	3	0.5
10			
2			

NNS Section 6 pages 66 – 67

**Some children in Year 6 may be taught the vertical format ( shown below) . These children must be secure with the grid method first. The aim is not for all children to learn the vertical format. The grid method is efficient, effective and appropriate and is the method adopted by our school.**

**5) Vertical format, compact working**

$$\begin{array}{r}
 56 \\
 \times 27 \\
 \hline
 1120 \text{ (} 56 \times 20 \text{)} \\
 392 \text{ (} 56 \times 7 \text{)} \\
 \hline
 1512
 \end{array}$$

NNS Section 6 pages 66 – 67

**By the end of year 6, children will have a range of calculation methods. Selection will depend on the numbers involved.**

**Children should not go onto the next stage if they are not ready and if they are not confident.**

Children should be encouraged to approximate their answers before calculating. Children should be encouraged to consider if a mental calculation would be appropriate before using a written method.

**PROGRESSION OF CALCULATION FOR DIVISION**

**MENTAL CALCULATION  
(ongoing)**

1. Doubling and halving.

- Using knowledge of multiplication tables and division facts and known multiples.

**Knowledge of multiplication tables is crucial to all work on division.**

MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED. THEY ARE NOT REPLACED BY WRITTEN METHODS

**Informal standard written methods**

Use informal pencil and paper methods to support, record and explain partial mental methods building on existing mental strategies.

- Sharing and grouping

e.g 8 sweets are shared equally between 4 children. How many does each child receive

$$\begin{array}{cccc} \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ 8 & - & 4 & = & 2 \end{array}$$

NNS Section 5 page 49

In most situations, grouping takes president over sharing. The exception is when dividing by two and possibly four. Then sharing (or halving) is the most efficient strategy and continues throughout Key Stage 1 and 2.

END OF YEAR 3

**2. Repeated subtraction using known multiples TU – U**

$$\begin{array}{r} \text{e.g. } 75 - 5 \\ 72 \\ 50 \text{ (10x5)} \\ 22 \\ 20 \text{ (4x5)} \\ 2 \qquad 14 \text{ r2} \end{array}$$

**PROGRESSION OF CALCULATION FOR DIVISION**

**3. Repeated subtraction using known multiples HTU – U**

To do this stage children need knowledge of:  $7 \times 3 = 21$  so  $7 \times 30 = 210$

$$\begin{array}{r} \text{e.g. } 256 - 7 = \\ 256 \\ - 70 \text{ (10x7)} \end{array}$$

$$\begin{array}{r}
 186 \\
 - 70 \quad (10 \times 7) \\
 46 \\
 - 42 \quad (6 \times 7) \\
 4 \qquad \qquad 36 \text{ r}4
 \end{array}$$

COMPACT to

$$\begin{array}{r}
 7256 \\
 - 210 \quad (30 \times 7) \\
 46 \\
 - 42 \quad (6 \times 7) \\
 4 \\
 36 \text{ r}4
 \end{array}$$

END OF YEAR 5

#### 4. Repeated subtraction using known multiples HTU – TU

e.g. 977 – 36	$  \begin{array}{r}  977 \\  - 360 \quad (10 \times 36) \\  617 \\  - 360 \quad (10 \times 36) \\  257 \\  - 180 \quad (5 \times 36) \\  77 \\  - 72 \quad (2 \times 36) \\  5 \\  6  \end{array}  $	<p>Compact to</p> $  \begin{array}{r}  36 \ 977 \\  - 720 \quad (20 \times 36) \\  257 \\  - 144 \quad (4 \times 36) \\  113 \\  - 72 \quad (2 \times 36) \\  41 \\  - 36 \quad (1 \times 36) \\  5  \end{array}  $
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27r5

YEAR 6 EXTEND TO BIGGER NUMBERS AND DECIMALS