



DOVER COURT  
INTERNATIONAL SCHOOL  
SINGAPORE

A NORD ANGLIA EDUCATION SCHOOL

9<sup>th</sup> November, 2016

# Maths at DCIS



# Maths in EYFS

## Prime Areas of Learning in EYFS

Early Years Foundation Stage statutory framework identifies three prime areas of learning:

- Personal, social and emotional development;
  - communication and language;
  - and physical development.
- The framework states that these three areas are “particularly crucial for igniting children’s curiosity and enthusiasm for learning, and for building their capacity to learn, form relationships and thrive.” It goes on to say that “practitioners working with the youngest children are expected to focus strongly on the three prime areas, which are the basis for successful learning in the other four specific areas.”



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## Four Specific Learning Areas

- Mathematics
- Expressive arts and design
- Literacy
- Understanding the world.

Together, the seven areas of learning and development shape educational programmes in early years settings, and all areas of learning and development are important and interconnected.

- Teachers know that although there may be a focus on the prime areas, maths learning doesn't begin at age three! Children need to hear 'maths talk' and have lots of opportunities to explore in a mathematical way from the very earliest months until the end of the Reception year.

## How do we effectively engage children?

- When planning to support mathematics, we reflect on the ways in which children learn and ensure both provision and practice are informed by this. These have been identified as the three characteristics of effective learning:
  - playing and exploring
  - active learning
  - creating and thinking critically



# Maths- Number (30-50 months)

- Uses some number names and number language spontaneously.
- Uses some number names accurately in play.
- Recites numbers in order to 10.
- Knows that numbers identify how many objects are in a set.
- Beginning to represent numbers using fingers, marks on paper or pictures.
- Sometimes matches numeral and quantity correctly.
- Shows curiosity about numbers by offering comments or asking questions.
- Compares two groups of objects, saying when they have the same number.
- Shows an interest in number problems.
- Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same.
- Shows an interest in numerals in the environment.
- Shows an interest in representing numbers.
- Realises not only objects, but anything can be counted, including steps, claps or jumps.



# Maths- Number (40-60 months)

- Recognise some numerals of personal significance.
- Recognises numerals 1 to 5.
- Counts up to three or four objects by saying one number name for each item.
- Counts actions or objects which cannot be moved.
- Counts objects to 10, and beginning to count beyond 10.
- Counts out up to six objects from a larger group.
- Selects the correct numeral to represent 1 to 5, then 1 to 10 objects.
- Counts an irregular arrangement of up to ten objects.
- Estimates how many objects they can see and checks by counting them.
- Uses the language of 'more' and 'fewer' to compare two sets of objects.
- Finds the total number of items in two groups by counting all of them.
- Says the number that is one more than a given number. Finds one more or one less from a group of up to five objects, then  $n$  objects.
- In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting.
- Records, using marks that they can interpret and explain and begins to identify own mathematical problems based on own interests and fascinations.



# Maths- Number ELG and Exceeding Descriptor

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- EARLY LEARNING GOALS

- Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number.
- Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.
- They solve problems, including doubling, halving and sharing.\

- Exceeding Descriptor

- Children estimate a number of objects and check quantities by counting up to 20. They solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups.

# Maths at DCIS

- 52 Nationalities – Many children will have different prior experiences to Maths at DCIS and the National Curriculum (UK based)
- Argentina - [Ministerio de Cultura y Educación, Gopher Menu](#)
- Australia - [Board of Studies, Curriculum and Standards Framework](#) - [Key Learning Areas](#) - [Department of Education](#)
- Belgium - Ministry of Education [French](#) - [Dutch](#)
- Brazil - [Ministério da Educação](#) and [Multieducação](#) - (Portuguese)
- Canada (Alberta) - [Mathematics: Alberta Program of Studies](#) English and French versions available in .pdf files for Adobe Acrobat Reader
- Canada (Ontario) - [Mathematics Curriculum](#)
- Denmark - [Ministry of Education](#) and [Education System in General](#)
- [European Ministries of Education](#) - a general listing
- Finland - [National Board of Education](#) (English)
- France - [Ministry of Education](#) - (French)



# Maths at DCIS

- Iceland - [Icelandic curriculum](#) (Icelandic)
- Israel - [Standards for Pupils of English: A Curriculum for Israeli Schools](#) (English)
- Italy - [Ministro della Pubblica Istruzione](#)
- Mexico - [Reforma a la Educación Básica y Normal](#) (Spanish)
- New Zealand - [National Curriculum](#) - from the Ministry of Education
- Norway - [Primary \(level 1-10\)](#) - [Upper secondary \(level 11-13\)](#) (Norwegian)
- Peru - [Ministry of Education](#) - (Spanish)
- Slovenia - [Ministry of Education in Slovenia](#) - [Uèni naèrti](#) (Slovenian)
- Sweden - Curriculum in [English](#) - [Swedish](#)
- **United Kingdom - [The National Curriculum](#)**
- USA - [Curriculum and Evaluation Standards For School Mathematics](#) (NCTM) National Council of Teachers of Mathematics
- USA - [Curriculum Standards](#) listed by state and content area
- [National Educational Technology - Standards for Students](#) an International Society for Technology in Education (ISTE) initiative

# Maths at DCIS



**DCIS follow the National Curriculum (United Kingdom)**

**At DCIS, we teach the strategies and model the guidance from the National Curriculum (United Kingdom)**

**Parent Handbook highlights the strategies / methods for the 4 operations.**

**Weekly homework is given in maths and this should also model strategies when appropriate.**

# Maths Year 1 – Year 6 – The Purpose

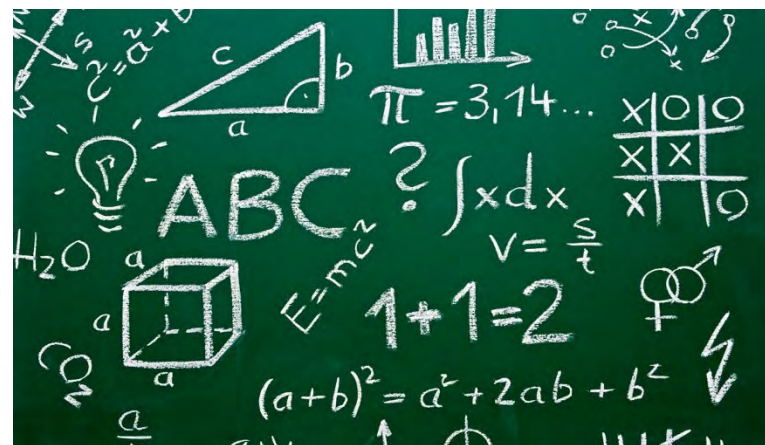
## Purpose of study

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.



[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/335158/PRIMARY\\_national\\_curriculum - Mathematics 220714.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/335158/PRIMARY_national_curriculum_-_Mathematics_220714.pdf)

# Maths Year 1 – Year 6 **The Aims**



## **Aims**

The national curriculum for mathematics aims to ensure that all pupils:

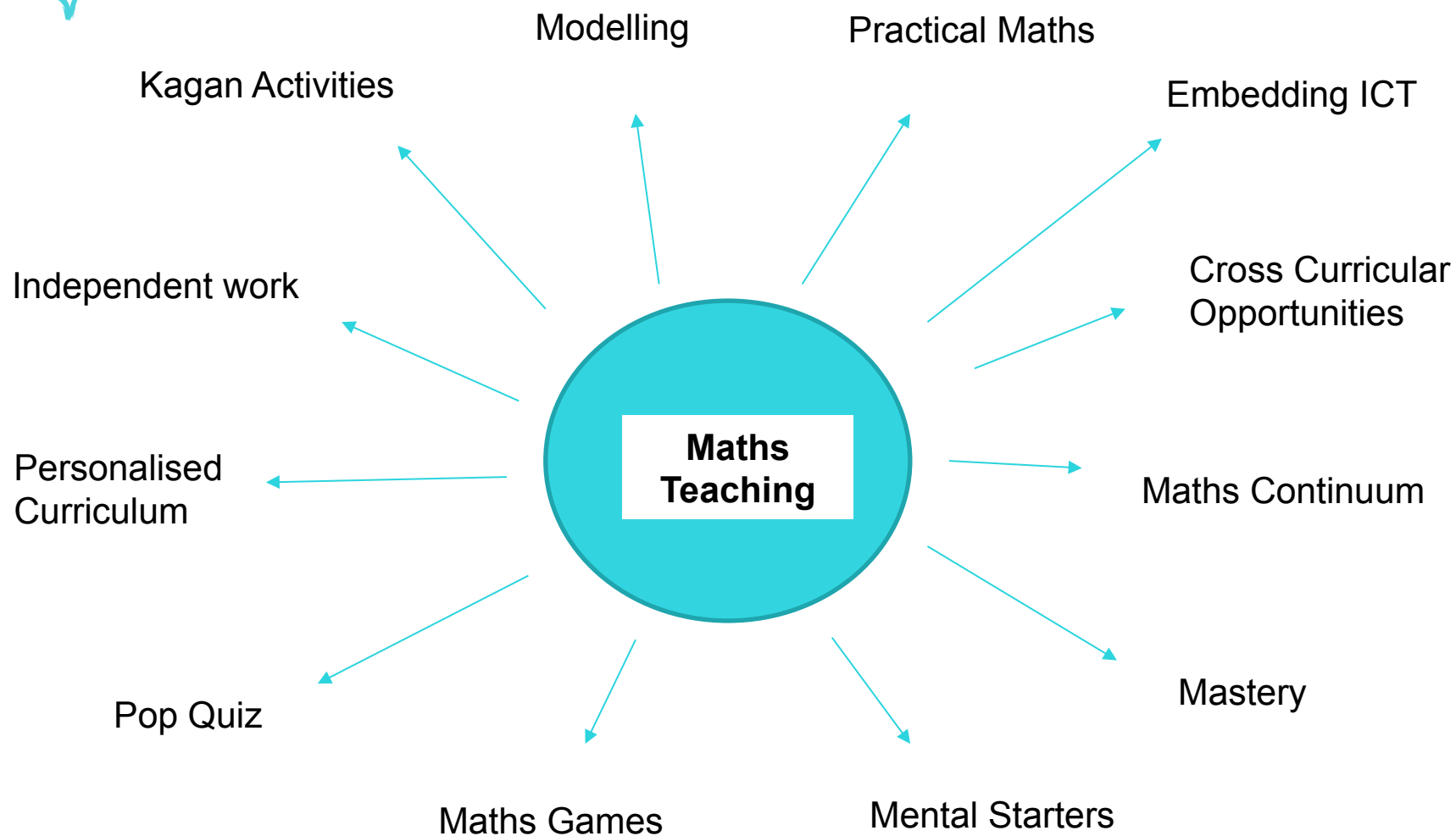
- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

# Maths Year 1 – Year 6 Progression

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

# Maths Year 1 – Year 6 Teaching methods



## Parent challenge...

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# What are the 10 programmes of study in the National Curriculum?

### 1. Number and Place Value

# Parent challenge...

## ▪ What are the 10 programmes of study in the National Curriculum?

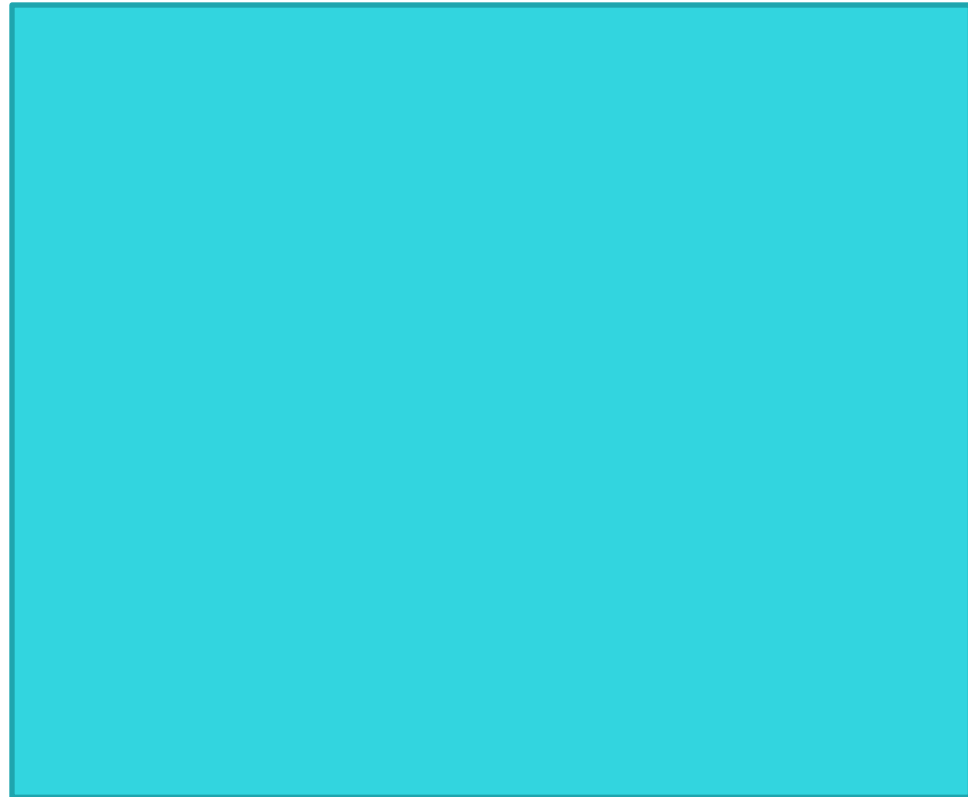
- **Number and Place Value**
- **A and S**
- **M and D**
- **F**
- **M**
- **G - P of S**
- **G - P and D**
- **S**
- **R**
- **A**



# Parent challenge...

## ▪ What are the 10 programmes of study in the National Curriculum?

- **Number and Place Value**
- **A** and **S**
- **M** and **D**
- **F**
- **M**
- **G** - **P** of **S**
- **G** - **P** and **D**
- **S**
- **R**
- **A**



# Maths Key Stage 1

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- **Programmes of Study:**      **Key Stage 1 (Year 1 and Year 2)**
- Number and Place Value
- Addition and Subtraction
- Fractions
- Measurement
- Geometry – Properties of shapes
- Geometry – Position and Direction
- Statistics

# Maths Key Stage 2

- **Programmes of Study: Key Stage 2 (Year 3 - Year 6)**
- Number and Place Value
- Addition and Subtraction
- Multiplication and Division
- Fractions
- Measurement
- Geometry – Properties of shapes
- Geometry – Position and Direction
- Statistics
- **Ratio and proportion**
- **Algebra**

# Maths Year 1 – Year 6

Mathematics – key stages 1 and 2

## Mathematics Appendix 1: Examples of formal written methods for addition, subtraction, multiplication and division

This appendix sets out some examples of formal written methods for all four operations to illustrate the range of methods that could be taught. It is not intended to be an exhaustive list, nor is it intended to show progression in formal written methods. For example, the exact position of intermediate calculations (superscript and subscript digits) will vary depending on the method and format used.

For multiplication, some pupils may include an addition symbol when adding partial products. For division, some pupils may include a subtraction symbol when subtracting multiples of the divisor.

### Addition and subtraction

789 + 642 becomes

$$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \hline 1 \quad 1 \end{array}$$

Answer: 1431

874 – 523 becomes

$$\begin{array}{r} 874 \\ - 523 \\ \hline 351 \\ \hline \end{array}$$

Answer: 351

932 – 457 becomes

$$\begin{array}{r} 8 \quad 12 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \\ \hline \end{array}$$

Answer: 475

932 – 457 becomes

$$\begin{array}{r} 1 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \\ \hline \end{array}$$

Answer: 475

The National Curriculum also lays out the methods to ensure that children can reinforce skills and strategies throughout their development.

# An example of a journey through a topic: Fractions Y1

## Number – fractions

### Statutory requirements

Pupils should be taught to:

- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

### Notes and guidance (non-statutory)

Pupils are taught half and quarter as 'fractions of discrete and continuous quantities by solving problems using shapes, objects and quantities. For example, they could recognise and find half a length, quantity, set of objects or shape. Pupils connect halves and quarters to the equal sharing and grouping of sets of objects and to measures, as well as recognising and combining halves and quarters as parts of a whole.

# An example of a journey through a topic: Fractions Y2

## Number – fractions

### Statutory requirements

Pupils should be taught to:

- recognise, find, name and write fractions  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{2}{4}$  and  $\frac{3}{4}$  of a length, shape, set of objects or quantity
- write simple fractions for example,  $\frac{1}{2}$  of 6 = 3 and recognise the equivalence of  $\frac{2}{4}$  and  $\frac{1}{2}$ .

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## Mathematics – key stages 1 and 2

### Notes and guidance (non-statutory)

Pupils use fractions as 'fractions of discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes. They meet  $\frac{3}{4}$  as the first example of a non-unit fraction.

Pupils should count in fractions up to 10, starting from any number and using the  $\frac{1}{2}$  and  $\frac{2}{4}$  equivalence on the number line (for example,  $1\frac{1}{4}$ ,  $1\frac{2}{4}$  (or  $1\frac{1}{2}$ ),  $1\frac{3}{4}$ , 2). This reinforces the concept of fractions as numbers and that they can add up to more than one.

# An example of a journey through a topic: Fractions Y3

## Number – fractions

### Statutory requirements

Pupils should be taught to:

- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example,  $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$ ]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

### Notes and guidance (non-statutory)

Pupils connect tenths to place value, decimal measures and to division by 10.

They begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the [0, 1] interval, including relating this to measure.

Pupils understand the relation between unit fractions as operators (fractions of), and division by integers.

They continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, and unit fractions as a division of a quantity.

Pupils practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency.

# An example of a journey through a topic: Fractions Y6

## Statutory requirements

Pupils should be taught to:

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions  $> 1$
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example,  $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ ]
- divide proper fractions by whole numbers [for example,  $\frac{1}{3} \div 2 = \frac{1}{6}$ ]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example,  $\frac{3}{8}$ ]
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places

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Mathematics – key stages 1 and 2

## Statutory requirements

- multiply one-digit numbers with up to two decimal places by whole numbers
- use written division methods in cases where the answer has up to two decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

The staff assess the children against these outcomes.

Assessment Parent Workshop on Wednesday 23<sup>rd</sup> November 2016



# Which year group?

- 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.

- recall multiplication and division facts for multiplication tables up to  $12 \times 12$

- complete a simple symmetric figure with respect to a specific line of symmetry.

- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

# An example of a journey through a topic: Fractions still Y6

## Notes and guidance (non-statutory)

Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other (for example,  $\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$ ) and progress to varied and increasingly complex problems.

Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle.

Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if  $\frac{1}{4}$  of a length is 36cm, then the whole length is  $36 \times 4 = 144$ cm).

They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators.

Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example,  $3 \div 8 = 0.375$ ). For simple fractions with recurring decimal equivalents, pupils learn about rounding the decimal to three decimal places, or other appropriate approximations depending on the context. Pupils multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. Pupils multiply decimals by whole numbers, starting with the simplest cases, such as  $0.4 \times 2 = 0.8$ , and in practical contexts, such as measures and money.

Pupils are introduced to the division of decimal numbers by one-digit whole number, initially, in practical contexts involving measures and money. They recognise division calculations as the inverse of multiplication.

Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers.

# What can you do to help your child at home?

## Numbers

Introduce them to number through opportunities that occur in everyday life. Numbers are all around us, and in the same way that we draw children's attention to letters and words in the environment, we need to talk about numbers with them too.

- Talk about the quantity of children who are in the room, playing in the sand, listening to the story.
- Talk about how many slices of apple or roast potatoes there are on the plate at lunchtime, or wheeled toys in the shed.

As they gain confidence, they move from saying number sequences to five, on to 10 and beyond. Watch out for these potential difficulties:

- Not separating number names – creating a string
- Missing out number names
- Repeating number names
- Using correct names, but in the wrong order
- Using number names in the correct order when starting from one or zero, but not when starting from another point
- Confusing 'teen' words and 'ty' words, e.g. fifteen and fifty
- Extending three and five to 'threeteen' and 'fiveteen' rather than 'thirteen' and 'fifteen'.

# How can I help my child at home?

## Maths is all around us!

- Make maths part of everyday life; it's all around us so point it out and make use of opportunities.



# How can I help my child at home?

## Younger children (3-7 years)

- Sorting things out and putting things away, e.g. shopping, toys, cutlery, clothes. Talk about which things go together and where things go, giving clear instructions for position such as 'in the cupboard, on the bottom shelf'.
- Matching pairs of socks, shoes, gloves.
- Ordering and sequencing when getting dressed, going to the shops, having a bath etc. First, ...next, ... and last of all.
- Comparing objects according to size, weight or capacity, e.g. the longest spoon, the lightest shopping bag, the cup which holds the most, the shortest person, the widest hand, the bottle which is half full.
- Matching and counting when setting the table, preparing food, sharing out food, etc.
- Counting, weighing, measuring capacity and timing when cooking
- Talking about time, referring to the clock at different times throughout the day, (preferably a clock with hands), setting times for certain events, e.g. 'We'll have lunch at 1 o'clock.', timing events, e.g. 'How long will it take to wash the dishes?'
- Handling small amounts of money when shopping, counting small totals.

# How can I help my child at home?

## Older children (8-11 years)

- Weighing, measuring capacity and timing when cooking. Converting a recipe for 4 people to one for 8 or even 6 people.
- Being involved with measuring and calculating how much curtain fabric is needed, how much wood for shelves, how many wall or floor tiles are needed, how much carpet etc.
- Talking about time, e.g. How long is it until lunch time? The journey takes 2½ hours, when will we arrive? We need to be there at 2.00 pm, when do we need to leave home?
- Handling amounts of money when shopping, working out total costs, working out change, checking receipts. Working out prices of sale items, e.g. 20% off. Managing pocket money and saving for things.
- Working out distances and directions from maps.
- Discussing and comparing prices e.g. electronics, clothes, house prices
- Working out how much petrol will be used on a journey, the cost of the petrol of a journey
- Costing journeys or holidays etc.

# How can I help my child at home?

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- Be supportive with homework but don't do it for your child
- Use the calculation methods that we use in school – they have changed since I went to school!
- Don't say; 'I know, I was terrible at maths too!'
- If it is causing stress, leave it and come back to it later
- Talk to us if there is a problem
- Try to have fun!



*Thank you*