

Multiplication and Division A Meeting for Parents

Alderley Edge Community Primary School



National Curriculum 2014 - 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.



Early Learning Goals 2012

Mathematics involves providing children with opportunities to:

- count reliably with numbers from 1 to 20
- place numbers in order
- say which number is one more or one less than a given number
- use quantities and objects
- add and subtract two single-digit numbers and count on or back to find the answer
- solve problems, including **doubling, halving** and **sharing**
- use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems
- recognise, create and describe patterns
- explore characteristics of everyday objects and shapes and use mathematical language to describe them



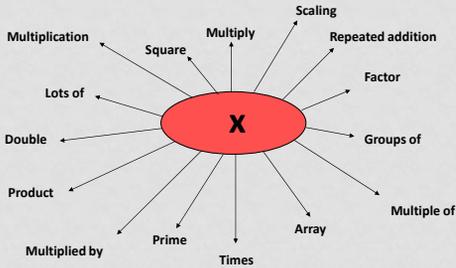
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The principal focus of mathematics teaching in:

- **key stage 1** is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve **working with numerals, words and the four operations, including with practical resources** [for example, concrete objects and measuring tools].
- **lower key stage 2** is to ensure that pupils become increasingly fluent with whole numbers and **the four operations**, including number facts and the concept of place value. This should ensure that pupils **develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers**.
- **upper key stage 2** is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should **develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio**.

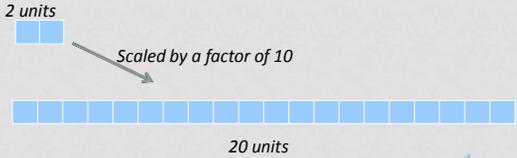


Multiplication



Scaling by a factor

Multiplication needs also to be understood as a scaling structure whereby a unit is increased by a scale factor. For example, multiplication by 10 would be interpreted as scaling by a factor of 10 as shown below.



Understanding multiplication

4 added together 5 times
 $4 + 4 + 4 + 4 + 4$
 4 multiplied by 5
 4×5
 5 lots of 4

5 added together 4 times
 $5 + 5 + 5 + 5$
 5 multiplied by 4
 5×4
 4 sets of 5

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Understanding arrays

$4 \times 5 = 20$

$5 \times 4 = 20$

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Progression in multiplication TU x U

Moving from arrays to the grid method:

$7 \times 14 =$

$70 + 28 = 98$

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Progression in multiplication HTU x TU

$53 \times 268 =$

| | | | | |
|----|--------|-------|-----|----------|
| | 200 | 60 | 8 | |
| 50 | 10 000 | 3 000 | 400 | = 14 204 |
| 3 | 600 | 180 | 24 | |

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National Curriculum 2014 - Mathematics Appendix 1: Examples of formal written methods for multiplication

Short multiplication

2741×6 becomes

| |
|-----------|
| 2 7 4 1 |
| x 6 |
| 1 6 4 4 6 |
| 4 2 |

Answer: 16 446

Long multiplication

124×26 becomes

| |
|---------|
| 1 2 4 |
| x 2 6 |
| 7 4 4 |
| 2 4 8 0 |
| 3 2 2 4 |
| 1 1 |

Answer: 3224

124×26 becomes

| |
|---------|
| 1 2 4 |
| x 2 6 |
| 7 4 4 |
| 2 4 8 0 |
| 3 2 2 4 |
| 1 1 |

Answer: 3224

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Division

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Prerequisite skills and experiences

- Count forwards and backwards
- Add and subtract accurately and efficiently
- Understand numerical and then abstract composite units, initially through money and skip counting
- A developed knowledge of multiplication as repeated addition and equal groups



Equal sharing; 12 divided between 2, for example 'Share 12 sweets equally between two children.'



Repeated subtraction of one



Each child has 6 sweets

12 divided between 2



Finding one-half of 12, for example 'Joe spends half of £12. How much does he spend?'



Halving

Joe spends £6

12 divided into 2



Grouping 12 into twos, for example, 'How many party bags containing 2 sweets can be made from 12 sweets?'



Repeated subtraction of groups



There are 6 party bags

12 divided by 2

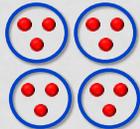


Division as sharing or grouping

- Take 12 counters and arrange them into 3 equal groups
- Take 12 different counters and arrange them into groups of 3
- Draw a diagram to represent each of the tasks and record the number sentence for each solution



$12 \div 3$ interpreted as sharing



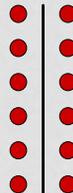
$12 \div 3$ interpreted as grouping



Linking to arrays

Sharing or finding $\frac{1}{2}$

How many in one column?



Grouping

How many rows are there?



Using composite groups

• How many 3s in 27 is how many units of 3 are there in 27

6 9 12 15 18 21 24 27

3 18

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Improving efficiency by using known facts - chunking

$71 \div 3 =$

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Division using multiplication facts

$412 \div 7 = 58 \text{ r } 6$

Partial tables:

$7 \times 1 = 7 \quad \therefore 7 \times 10 = 70$
 $7 \times 2 = 14 \quad \therefore 7 \times 20 = 140$
 $7 \times 5 = 35 \quad \therefore 7 \times 50 = 350$

$7 \overline{) 412}$
 $- 350$
 62
 $- 56$
 6

$\times 50$
 $\times 8$

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National Curriculum 2014 - Mathematics Appendix 1: Examples of formal written methods for division

Short division

$432 \div 5$ becomes

$5 \overline{) 432}$
 $86 \text{ r } 2$
 Answer: 86 remainder 2

Long division

$432 \div 15$ becomes

$15 \overline{) 4320}$
 288
 300
 132
 120
 12
 $\frac{12}{15} = \frac{4}{5}$
 Answer: $28 \frac{4}{5}$

$432 \div 15$ becomes

$15 \overline{) 4320}$
 288
 300
 132
 120
 120
 0
 Answer: 28.8

How can parents help . . .

Talking about mathematics in everyday situations:

- counting when climbing the stairs, laying the table, shopping
- practise saying the number names in order – forwards and backwards, starting with different numbers, taking it in turns, skip counting
- Counting coins to find the number, then amount
- Baking, weighing, cooking, scaling up and down recipes
- Have a fact of the day to practise – you could pin it up around the house!

Playing games:

- Snakes and ladders, Ludo, Monopoly
- Guess who?, Connect 4, Dominoes, Yahtzee, Card games
- Snap, Happy Families

If they are stuck useful questions:

- What have you got to do?
- How have you started?
- What have you found out so far?

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