The National Strategies
Primary

Guidance

Curriculum
and standards

# Overcoming barriers in mathematics –

helping children move from level 2 to level 3


**Year 3 and 4 teachers, mathematics subject leaders, headteachers and LA consultants**

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department for
children, schools and families

**PC minimum specification for viewing the *Overcoming barriers in mathematics – helping children move from level 2 to level 3 CD-ROM* (00099-2008CDO-EN)**

CPU: Pentium III or greater
RAM: 128 MB
HD with 100 MB of free space
CD-ROM drive
SVGA graphics card (16 bit colour)
Keyboard and mouse (Microsoft compatible)
Operating system: Windows 98 or later
PowerPoint® 2000 or later (or PowerPoint® viewer 2007)

**Mac minimum specification for viewing the *Overcoming barriers in mathematics – helping children move from level 2 to level 3 CD-ROM* (00099-2008CDO-EN)**

CPU: Mac G4 500MHz processor or greater
RAM: 256 MB
HD with 100 MB of free space
CD-ROM drive
SVGA graphics card (16 bit colour)
Keyboard and mouse
Operating system: Mac OS X or later
PowerPoint® 2000 or later (or PowerPoint® viewer 2007)

**Instructions for running the CD-ROM**

To run this CD-ROM you will need to have either a copy of Microsoft PowerPoint® 2000 (or a later version) or Microsoft PowerPoint® Viewer 2007. You can download and install the viewer from www.microsoft.com

If you have PowerPoint® 2000 or a later version:

- Insert the CD-ROM into your CD-ROM tray.
- For PC users, double click to open My Computer, then double click on the CD-ROM icon to open the CD-ROM.
- For Mac users, double click on the CD-ROM icon on your desktop to open the CD-ROM.
- Double click on the PowerPoint® file '**start_here.ppt**'.
- From the menu bar, go to **View** > **Slide Show** or press **F5** to run the PowerPoint® presentation.

If you **do not** have PowerPoint® 2000 or later:

- Insert the CD-ROM into your CD-ROM tray.
- For PC users, double click to open My Computer, then double click on the CD-ROM icon to open the CD-ROM.
- For Mac users, double click on the CD-ROM icon on your desktop to open the CD-ROM.
- Double click on the PowerPoint® slide show called '**start_here.pps**'.

Please note: If the resource does not launch, you will need to download and install the latest version of Microsoft PowerPoint® Viewer 2007 from www.microsoft.com

**If you have problems opening the PDFs on this CD and have Adobe Acrobat Reader 7.0 installed, try following these steps:**

1. Start Adobe Acrobat Reader.
2. On the Help menu, click Check for updates now.
3. Under Current updates, click Adobe Acrobat 7.0.1 and Reader 7.0.1 Update, and then click Add.
4. Click Update.

# Overcoming barriers in mathematics – helping children move from level 2 to level 3

## Contents



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## Introduction

Welcome to this CD-based resource. The materials are designed to help you ensure that, in mathematics, Year 3 and Year 4 children progress from level 2 to level 3 by the end of Year 4. Increasing numbers of children are achieving level 3, but some children still meet barriers in their learning that slow or block their progress. The materials on the CD provide teaching resources and ideas upon which you can draw when planning additional support for those children. This CD is one of a set of focused intervention materials that are being developed for mathematics. Materials to support moving children from level 3 to level 4 are already available (Ref: 00695-2007PCK-EN). We hope that you will find these materials useful when planning your teaching to help children working around the level 2 to level 3 border make good progress.

## What mathematics appears on the CD?

The materials address key areas of mathematics that Year 3 and Year 4 children working at level 2 often find challenging – the areas of mathematics in which children need additional support to help them maintain progress over Key Stage 2. While the CD includes all the Year 3 and Year 4 learning objectives for mathematics, not all these objectives have materials to support them, only those that have been identified as common barriers to progress.

## How were the areas of mathematics identified?

The decision as to which areas of mathematics to include on the CD was informed by a scrutiny of optional QCA test scripts of children whose attainment fell below, but was close to, the level 2 to 3 boundary. This analysis was supported by evidence from other sources. It drew on QCA reports, research evidence and feedback from teachers and consultants. This evidence pointed to a number of common barriers in mathematics that often prevent children from making progress. These are the areas of mathematics that appear on the CD – the bits of mathematics children find difficult to learn, which are often the bits that are more difficult to teach.

## How do I access the materials?

The materials on the CD are accessed through the learning objectives for mathematics as set out in the Primary Framework. The objectives are organised into the seven strands of the Framework to help you match them to the Unit of work you might be teaching. At the back of this booklet there is a sequence of charts. The charts make links between level descriptions, common barriers to progress, the associated Year 3 and Year 4 objectives, and materials on the CD, with reference to the Blocks and Units in the Primary Framework. This provides a see-at-a-glance guide to support you in identifying key barriers in moving children from level 2 to level 3 and pinpointing where children are having difficulties and how to move them on.

The CD draws on existing materials, some of which can be found in the Primary Framework, and provides extra support and guidance on teaching approaches designed to support children in overcoming identified barriers to progress.

## Who are these materials aimed at?

The materials are designed to be used flexibly and as appropriate for your planning and teaching context. There are aspects that require intervention by you, as the teacher, drawing on your knowledge of children's progress in mathematics, for example, when using the 'Can I…?' prompts and review questions to pinpoint barriers to progress. After the barriers to learning have been identified, other elements might be used by

a teaching assistant or additional adults to support learning, or might provide a focus for targeted booster support. These materials could be used with an individual child or with a group of children who share similar barriers to progress.

The materials are designed to be used with children who are at risk of not making the necessary progress to move from level 2 to secure level 3 and therefore not meeting age-related expectations by the end of Year 4.

## How do the materials link to the Primary Framework?

The structure of the CD follows that of the Primary Framework, with the strands and objectives providing the way into the 'Can I…?' questions and related teaching materials and resources. The grids at the end of this booklet show how these objectives fit into the Blocks and Units structure of the Framework, where further materials including 'I can…' targets and assessment for learning (AfL) prompts can be found. The Assessment section of the Framework will help you to identify areas of mathematics that require additional focus with children working at the level 2 to 3 border, and the materials on this CD could then be used to help address these areas.

## How are the CD materials structured?

The entry point to access the materials has been aligned to six of the seven strands of mathematics used in the Primary Framework. The *Using and applying mathematics* strand is embedded in the materials rather than identified as a separate set of 'Can I...?' questions. This is to place the use and application of mathematics at the heart of the teaching and learning cycle to ensure that children have sufficient opportunity to apply their learning – and that the learning is sufficiently secure to enable them to use their mathematics in new contexts and make connections across their learning.


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The materials on the CD support the cycle that underpins the Primary Framework: *review and assess–teach–practise–apply–review and assess*. Each stage is supported by prompts and linked materials.

The cycle is set out in more detail below to show how it informs the structure of the materials on the CD.

| Review and assess | Teach | Practise | Apply | Review and assess |
|---|---|---|---|---|
| **Example review questions**<br>Use the example review questions to confirm that this is a barrier to learning and identify any specific misconceptions | **Teaching guidance**<br>The teaching guidance document provides background information about vocabulary, models and images, and teaching approaches | **Consolidation and practice**<br>Select from suggested linked resources to provide opportunities for consolidation and practice | **Opportunities to use and apply**<br>Use these prompts to ensure children can apply their knowledge within mathematics and/or other areas of the curriculum | **Confirming learning**<br>Assess whether progress has been made by asking some of the probing questions |

## How should I use the materials on the CD?

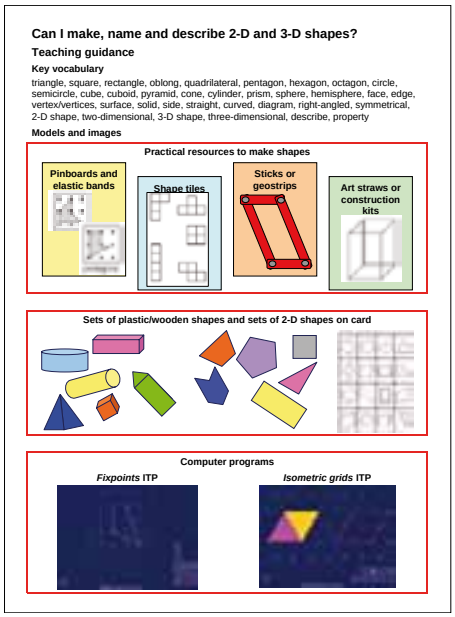
The first step in using the CD is to carry out an assessment of the children's learning to identify where support is needed. The Assessment section of the Primary Framework provides materials to support you with this. Select the objective linked to an identified barrier to learning for an individual or group of children. Then select the relevant 'Can I…?' question linked to this barrier. The tables on the next few pages explain the structure of screens on the CD and the linked resources.

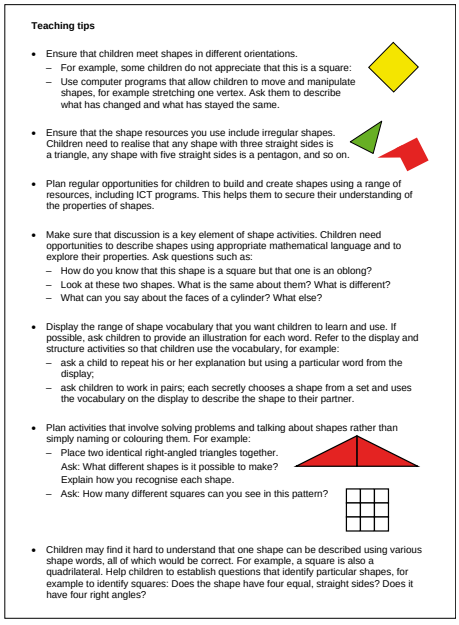
# Contents of the CD


From your tracking of children's progress and ongoing assessment you will have identified potential barriers to learning. The **Example review questions** provide support for confirming that this area is a barrier to learning for children and identifying any specific misconceptions.

The questions might be used as starting points for discussion with small groups or individuals.

Depending upon the area of mathematics, the questions include suggestions for closed and open-ended questions, and questions requiring reasoning and discussion.




The **Teaching guidance** provides background information about appropriate vocabulary, models and images, and teaching approaches. The list of vocabulary is a useful reference point for key vocabulary that children need to be able to use and explain. The models and images are drawn from a variety of sources, including the former models and images charts, intervention materials and interactive teaching programs, and often include some suggestions for their use. The *Teaching tips* section provides a few starting points for tackling the area of mathematics with children, ways of linking concepts with other areas of the curriculum, or ways of overcoming misconceptions.


The **Consolidation and practice** pages provide links to a variety of existing resources that can be used by children in guided or independent work.

The ICT resources include interactive teaching programs (ITPs) and spreadsheets. Where the ITP guide symbol appears, this links to a guidance document to support the use of ITPs.

Further ITPs can be found in the library of the Framework website at www.standards.dfes.gov.uk/primaryframeworks/library/Mathematics/ICTResources/itps/

Also linked to these pages are relevant intervention materials, drawn from the Springboard 3 and 4 packages. In line with the Primary Framework, these materials have been linked where they could help children to overcome barriers to progress in a specific area of mathematics.


The **Opportunities to use and apply** pages provide suggestions for how children might make use of a specific area of mathematics. This includes three key areas: applying understanding in a reasoning context, for example using knowledge of rounding to read scales to the nearest interval; applying in other areas of mathematics, for example using the ability to multiply by 10 and 100 to work out conversions between cm and m; and, finally, using and applying mathematics across the curriculum and in out-of-school contexts.


The **Confirming learning** section for each 'Can I…?' question provides questions, prompts and activities to probe children's understanding. These can be adapted to be used as assessment activities for individuals or small groups in order to assess whether progress has been made in this area of mathematics.

## What is available to help me build the materials into my planning?

On the next few pages is a set of see-at-a-glance charts to help you to carry out your assessments and to plan appropriate learning and teaching. The level 2 and level 3 descriptions for the Number and algebra, Shape, space and measures and Handling data attainment targets are listed, together with the difficulties that the range of analyses has identified as most common in limiting children's progress from level 2 to level 3. After the level descriptions for each attainment target are charts with the learning objectives for Years 3 and 4 taken from the relevant strands that can be used to inform your planning. These have the appropriate 'Can I…?' questions that appear on the CD aligned to the objectives. The 'Can I…?' questions might be shared with children as part of the assessment process, inviting them to identify the mathematics they can do in the context of the question and what they still find difficult. They might also be turned into 'I can…' statements to generate curricular targets, using the materials on the CD and the Primary Framework to draw together success criteria to share and discuss with children. The final set of charts indicate where each of the objectives for Years 3 and 4 appear in the Blocks and Units structure of the Primary Framework.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## Number and algebra

| **Attainment target 2: Number and algebra** | | |
|---|---|---|
| Level 2 | Level 3 | Commonly encountered difficulties |
| Pupils count sets of objects reliably, and use mental recall of addition and subtraction facts to 10. They begin to understand the place value of each digit in a number and use this to order numbers up to 100. They choose the appropriate operation when solving addition and subtraction problems. They use the knowledge that subtraction is the inverse of addition. They use mental calculation strategies to solve number problems involving money and measures. They recognise sequences of numbers, including odd and even numbers. | Pupils show understanding of place value in numbers up to 1000 and use this to make approximations. They begin to use decimal notation and to recognise negative numbers, in contexts such as money and temperature. Pupils use mental recall of addition and subtraction facts to 20 in solving problems involving larger numbers. They add and subtract numbers with two digits mentally and numbers with three digits using written methods. They use mental recall of the 2, 3, 4, 5 and 10 multiplication tables and derive the associated division facts. They solve whole-number problems involving multiplication or division, including those that give rise to remainders. They use simple fractions that are several parts of a whole and recognise when two simple fractions are equivalent. | ■ Using understanding of place value to order two-digit and three-digit numbers and round numbers to the nearest 10 and 100<br>■ Using and understanding decimal notation<br>■ Reading, writing and understanding simple fractions<br>■ Finding unit fractions of a whole<br>■ Recalling and using addition and subtraction facts to 20<br>■ Using mental strategies to add and subtract two-digit numbers<br>■ Recalling multiplication facts and deriving corresponding division facts<br>■ Using understanding of place value to multiply one-digit and two-digit numbers by 10 and 100<br>■ Using recording to support and explain multiplication and division of two-digit numbers by one-digit numbers<br>■ Understanding and explaining remainders after division<br>■ Solving one-step and two-step problems |

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| Counting and understanding number strand | | |
|---|---|---|
| Year 3 objectives | Year 4 objectives | Overcoming barriers sequences |
| … count on from and back to zero in single-digit steps or multiples of 10 | Recognise and continue number sequences formed by counting on or back in steps of constant size | |
| Round two-digit or three-digit numbers to the nearest 10 or 100 and give estimates for their sums and differences | Partition, round and order four-digit whole numbers; use positive and negative numbers in context and position them on a number line; state inequalities using the symbols < and > (e.g. –3 > –5, –1 < +1) | ■ Can I read, write and partition whole numbers to 1000?<br>■ Can I order two-digit and three-digit numbers and position these on a number line?<br>■ Can I round whole numbers to 1000 to the nearest 10 or 100? |
| Read, write and order whole numbers to at least 1000 and position them on a number line… | | |
| Partition three-digit numbers into multiples of 100, 10 and 1 in different ways | | |
| | Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement; position one-place and two-place decimals on a number line | ■ Can I use and explain decimal notation for tenths and hundredths? |
| | Recognise the equivalence between decimal and fraction forms of one half, quarters, tenths and hundredths | |
| Read and write proper fractions (e.g. $\frac{3}{7}$, $\frac{9}{10}$) interpreting the denominator as the parts of a whole and the numerator as the number of parts; identify and estimate fractions of shapes; use diagrams to compare fractions and establish equivalents | Use diagrams to identify equivalent fractions (e.g. $\frac{6}{8}$ and $\frac{3}{4}$, or $\frac{70}{100}$ and $\frac{7}{10}$); interpret mixed numbers and position them on a number line (e.g. $3\frac{1}{2}$) | ■ Can I read and write fractions and explain their meaning? |
| | Use the vocabulary of ratio and proportion to describe the relationship between two quantities (e.g. 'There are 2 red beads to every 3 blue beads, or 2 beads in every 5 beads are red'); estimate a proportion (e.g. 'About one quarter of the apples in the box are green') | |



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| Knowing and using number facts strand | | |
|---|---|---|
| Year 3 objectives | Year 4 objectives | Overcoming barriers sequences |
| Derive and recall all addition and subtraction facts for each number to 20, sums and differences of multiples of 10 and number pairs that total 100 | Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000 | ■ Can I recall and use addition and subtraction facts to 20?<br>■ Can I find pairs of numbers that total 100? |
| | Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves | |
| Derive and recall multiplication facts for the 2, 3, 4, 5, 6 and 10 times-tables and the corresponding division facts; recognise multiples of 2, 5 or 10 up to 1000 | Derive and recall multiplication facts up to 10 × 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple | ■ Can I recall multiplication and division facts for the 2, 3, 4, 5 and 10 times-tables?<br>■ Can I use understanding of multiplication and division to solve problems? |
| Use knowledge of number operations and corresponding inverses, including doubling and halving, to estimate and check calculations | Use knowledge of rounding, number operations and inverses to estimate and check calculations | |
| | Identify pairs of fractions that total 1 | |

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| Calculating strand | | |
|---|---|---|
| Year 3 objectives | Year 4 objectives | Overcoming barriers sequences |
| Add or subtract mentally combinations of one-digit and two-digit numbers | Add or subtract mentally pairs of two-digit whole numbers (e.g. 47 + 58, 91 – 35) | ■ Can I subtract mentally combinations of one-digit and two-digit numbers?<br>■ Can I say a subtraction fact that is the inverse of an addition fact, and vice versa? |
| Develop and use written methods to record, support or explain addition and subtraction of two-digit and three-digit numbers | Refine and use efficient written methods to add and subtract two-digit and three-digit whole numbers and £.p | |
| Multiply one-digit and two-digit numbers by 10 or 100, and describe the effect | Multiply and divide numbers to 1000 by 10 and then 100 (whole-number answers), understanding the effect; relate to scaling up or down | ■ Can I multiply one-digit and two-digit numbers by 10 and 100? |
| Use practical and informal written methods to multiply and divide two-digit numbers (e.g. 13 × 3, 50 ÷ 4); round remainders up or down, depending on the context | Develop and use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (e.g. 15 × 9, 98 ÷ 6) | ■ Can I multiply a two-digit number by a one-digit number?<br>■ Can I divide a two-digit number by a one-digit number and explain any remainders? |
| Understand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentences | | |
| Find unit fractions of numbers and quantities (e.g. ½, ⅓, ¼ and ⅛ of 12 litres) | Find fractions of numbers, quantities or shapes (e.g. ⅕ of 30 plums, ⅜ of a 6 by 4 rectangle) | ■ Can I find a unit fraction of a shape, number or quantity by splitting it into the correct number of equal parts? |
| | Use a calculator to carry out one-step and two-step calculations involving all four operations; recognise negative numbers in the display, correct mistaken entries and interpret the display correctly in the context of money | ■ Can I identify the calculation needed to solve a word problem?<br>■ Can I identify the stages involved in a two-step problem?<br>■ Can I explain and record my methods and solutions? |



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## Shape, space and measures

| **Attainment target 3: Shape, space and measures** | | |
|---|---|---|
| Level 2 | Level 3 | Commonly encountered difficulties |
| Pupils use mathematical names for common 3-D and 2-D shapes and describe their properties, including numbers of sides and corners. They distinguish between straight and turning movements, understand angle as a measurement of turn, and recognise right angles in turns. They begin to use everyday non-standard and standard units to measure length and mass. | Pupils classify 3-D and 2-D shapes in various ways using mathematical properties such as reflective symmetry for 2-D shapes. They use non-standard units, standard metric units of length, capacity and mass, and standard units of time, in a range of contexts. | ■ Using mathematical vocabulary to name and describe 3-D and 2-D shapes<br>■ Classifying 3-D and 2-D shapes according to their properties<br>■ Explaining relationships between standard units of length, mass and capacity<br>■ Reading and interpreting numbered and partly numbered scales<br>■ Reading analogue clocks to the nearest 5 minutes and using the vocabulary of time<br>■ Converting analogue times to digital times, and vice versa<br>■ Calculating time intervals |

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| Understanding shape strand | | |
|---|---|---|
| Year 3 objectives | Year 4 objectives | Overcoming barriers sequences |
| Relate 2-D shapes and 3-D solids to drawings of them; describe, visualise, classify, draw and make the shapes | Draw polygons and classify them by identifying their properties, including their line symmetry<br><br>Visualise 3-D objects from 2-D drawings; make nets of common solids | ■ Can I make, name and describe 2-D and 3-D shapes?<br><br>■ Can I sort shapes choosing my own criteria? |
| Draw and complete shapes with reflective symmetry; draw the reflection of a shape in a mirror line along one side | | |
| Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid | Recognise horizontal and vertical lines; use the eight compass points to describe direction; describe and identify the position of a square on a grid of squares | |
| Use a set-square to draw right angles and to identify right angles in 2-D shapes; compare angles with a right angle; recognise that a straight line is equivalent to two right angles | Know that angles are measured in degrees and that one whole turn is 360°; compare and order angles less than 180° | |





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| Measuring strand | | |
|---|---|---|
| Year 3 objectives | Year 4 objectives | Overcoming barriers sequences |
| Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements | Choose and use standard metric units and their abbreviations when estimating, measuring and recording length, weight and capacity; know the meaning of 'kilo', 'centi' and 'milli' and, where appropriate, use decimal notation to record measurements (e.g. 1.3 m or 0.6 kg) | ■ Can I explain the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres? |
| Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy | Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit | ■ Can I explain what each division means on a numbered or partly numbered line and use this information to read a scale to the nearest division or half-division? |
| | Draw rectangles and measure and calculate their perimeters; find the area of rectilinear shapes drawn on a square grid by counting squares | |
| Read the time on a 12-hour digital clock and to the nearest 5 minutes on an analogue clock; calculate time intervals and find start or end times for a given time interval | Read time to the nearest minute; use am, pm and 12-hour clock notation; choose units of time to measure time intervals; calculate time intervals from clocks and timetables | ■ Can I read the time to the nearest 5 minutes on an analogue clock using the correct vocabulary?<br>■ Can I show on a digital clock a time given to me on an analogue clock, and the other way round?<br>■ Can I work out how long it is between two times? |

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## Handling data

| **Attainment target 4: Handling data** | | |
|---|---|---|
| Level 2 | Level 3 | Commonly encountered difficulties |
| Pupils sort objects and classify them using more than one criterion. When they have gathered information, pupils record results in simple lists, tables and block graphs, in order to communicate their findings. | Pupils extract and interpret information presented in simple tables and lists. They construct bar charts and pictograms, where the symbol represents a group of units, to communicate information they have gathered, and they interpret information presented to them in these forms. | ■ Creating and interpreting pictograms where the symbols represent more than one object<br>■ Creating and interpreting the information displayed in a bar chart<br>■ Using tables and lists to help solve a problem<br>■ Answering a question by analysing and interpreting data |

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| Handling data strand | | |
|---|---|---|
| Year 3 objectives | Year 4 objectives | Overcoming barriers sequences |
| Answer a question by collecting, organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations; use ICT to create a simple bar chart | Answer a question by identifying what data to collect; organise, present, analyse and interpret the data in tables, diagrams, tally charts, pictograms and bar charts, using ICT where appropriate | ■ Can I create and interpret a pictogram where the symbols represent more than one object?<br>■ Can I create and interpret bar charts?<br>■ Can I make and use lists and tables to organise and interpret information to solve a problem?<br>■ Can I use data to answer a question? |
| Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion | | |
| | Compare the impact of representations where scales have intervals of differing step size | |

# Links between objectives and Units

| Using and applying mathematics strand | | | |
|---|---|---|---|
| Year 3 objectives | Units | Year 4 objectives | Units |
| Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations | 3D1, 3B2, 3E2, 3A3, 3B3, 3D3, 3E3 | Solve one-step and two-step problems involving numbers, money or measures, including time; choose and carry out appropriate calculations, using calculator methods where appropriate | 4B1, 4D1, 4D2, 4A3, 4B3, 4D3 |
| Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using £.p notation or units of measure | 3B1, 3B2, 3D2, 3B3 | Represent a puzzle or problem using number sentences, statements or diagrams; use these to solve the problem; present and interpret the solution in the context of the problem | 4E1, 4E2, 4E3 |
| Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information | 3C1, 3E1, 3C2, 3C3, 3E3 | Suggest a line of enquiry and the strategy needed to follow it; collect, organise and interpret selected information to find answers | 4C1, 4C2, 4C3 |
| Identify patterns and relationships involving numbers or shapes, and use these to solve problems | 3B1, 3E1, 3B2, 3B3, 3E3 | Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement involving numbers and test it with examples | 4B1, 4B2, 4B3 |
| Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams | 3A1, 3A2, 3C3 | Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols | 4A1, 4B1, 4C1, 4A2, 4B2, 4C2, 4B3, 4C3 |

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Bold text signifies end-of-year (EOY) objectives

| Counting and understanding number strand | | | |
|---|---|---|---|
| Year 3 objectives | Units | Year 4 objectives | Units |
| … count on from and back to zero in single-digit steps or multiples of 10 | 3A1 | Recognise and continue number sequences formed by counting on or back in steps of constant size | 4A1, 4A2, 4A3 |
| Round two-digit or three-digit numbers to the nearest 10 or 100 and give estimates for their sums and differences | 3A2, 3A3 | Partition, round and order four-digit whole numbers; use positive and negative numbers in context and position them on a number line; state inequalities using the symbols < and > (e.g. –3 > –5, –1 < +1) | 4A1, 4A3 |
| Read, write and order whole numbers to at least 1000 and position them on a number line… | 3A1 | | |
| **Partition three-digit numbers into multiples of 100, 10 and 1 in different ways** | 3A1, 3A2, 3E3 | Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement; position one-place and two-place decimals on a number line | 4A2, 4D2, 4A3, 4D3 |
| | | Recognise the equivalence between decimal and fraction forms of one half, quarters, tenths and hundredths | 4E1, 4E2, 4E3 |
| Read and write proper fractions (e.g. $\frac{3}{7}$, $\frac{9}{10}$) interpreting the denominator as the parts of a whole and the numerator as the number of parts; identify and estimate fractions of shapes; use diagrams to compare fractions and establish equivalents | 3B2, 3E2, 3B3, 3E3 | **Use diagrams to identify equivalent fractions (e.g. $\frac{6}{8}$ and $\frac{3}{4}$, or $\frac{70}{100}$ and $\frac{7}{10}$); interpret mixed numbers and position them on a number line (e.g. $3\frac{1}{2}$)** | 4E1, 4E2, 4E3 |
| | | Use the vocabulary of ratio and proportion to describe the relationship between two quantities (e.g. 'There are 2 red beads to every 3 blue beads, or 2 beads in every 5 beads are red'); estimate a proportion (e.g. 'About one quarter of the apples in the box are green') | 4E3 |

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| Knowing and using number facts strand | | | |
|---|---|---|---|
| Year 3 objectives | Units | Year 4 objectives | Units |
| **Derive and recall all addition and subtraction facts for each number to 20, sums and differences of multiples of 10 and number pairs that total 100** | 3A1, 3B1, 3E1, 3A2, 3B2, 3B3 | Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000 | 4A1, 4B1, 4B3 |
| | | Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves | 4A1, 4B2, 4B3 |
| Derive and recall multiplication facts for the 2, 3, 4, 5, 6 and 10 times-tables and the corresponding division facts; recognise multiples of 2, 5 or 10 up to 1000 | 3B1, 3E1, 3A2, 3B2, 3E2, 3A3, 3B3, 3E3 | **Derive and recall multiplication facts up to 10 × 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple** | 4A1, 4B1, 4E1, 4A2, 4B2, 4D2, 4E2, 4A3, 4B3, 4E3 |
| Use knowledge of number operations and corresponding inverses, including doubling and halving, to estimate and check calculations | 3B1, 3B3, 3D3 | Use knowledge of rounding, number operations and inverses to estimate and check calculations | 4A1, 4B1, 4A2, 4B2, 4A3, 4B3 |
| | | Identify pairs of fractions that total 1 | 4E1, 4E2 |

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| Calculating strand | | | |
|---|---|---|---|
| Year 3 objectives | Units | Year 4 objectives | Units |
| **Add or subtract mentally combinations of one-digit and two-digit numbers** | 3A1, 3D1, 3A2, 3D2, 3A3 | **Add or subtract mentally pairs of two-digit whole numbers (e.g. 47 + 58, 91 – 35)** | 4A1, 4D1, 4A2, 4A3 |
| Develop and use written methods to record, support or explain addition and subtraction of two-digit and three-digit numbers | 3D2, 3A3, 3D3, 3E3 | Refine and use efficient written methods to add and subtract two-digit and three-digit whole numbers and £.p | 4A2, 4D2, 4A3, 4D3 |
| Multiply one-digit and two-digit numbers by 10 or 100, and describe the effect | 3A2, 3E2 | Multiply and divide numbers to 1000 by 10 and then 100 (whole number answers), understanding the effect; relate to scaling up or down | 4A1, 4A2 |
| Use practical and informal written methods to multiply and divide two-digit numbers (e.g. 13 × 3, 50 ÷ 4); round remainders up or down, depending on the context | 3E1, 3D2, 3E2, 3A3, 3D3, 3E3 | **Develop and use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (e.g. 15 × 9, 98 ÷ 6)** | 4A2, 4D2, 4A3, 4E3 |
| Understand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentences | 3E2, 3D3 | | |
| Find unit fractions of numbers and quantities (e.g. ½, ⅓, ¼ and ⅙ of 12 litres) | 3D1, 3E1, 3D2, 3E2, 3E3 | Find fractions of numbers, quantities or shapes (e.g. ⅕ of 30 plums, ⅜ of a 6 by 4 rectangle) | 4E1, 4E2, 4E3 |
| | | Use a calculator to carry out one-step and two-step calculations involving all four operations; recognise negative numbers in the display, correct mistaken entries and interpret the display correctly in the context of money | 4A1, 4A3 |



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| Understanding shape strand | | | |
|---|---|---|---|
| Year 3 objectives | Units | Year 4 objectives | Units |
| Relate 2-D shapes and 3-D solids to drawings of them; describe, visualise, classify, draw and make the shapes | 3B1, 3B2, 3B3 | Draw polygons and classify them by identifying their properties, including their line symmetry<br><br>Visualise 3-D objects from 2-D drawings; make nets of common solids | 4B1, 4B2, 4B3 |
| **Draw and complete shapes with reflective symmetry and draw the reflection of a shape in a mirror line along one side** | 3B2, 3D2 | | |
| Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid | 3D1, 3D2 | Recognise horizontal and vertical lines; use the eight compass points to describe direction; describe and identify the position of a square on a grid of squares | 4D1, 4D2 |
| Use a set-square to draw right angles and to identify right angles in 2-D shapes; compare angles with a right angle; recognise that a straight line is equivalent to two right angles | 3D2, 3B3, 3D3 | **Know that angles are measured in degrees and that one whole turn is 360°; compare and order angles less than 180°** | 4D2, 4D3 |

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| Measuring strand | | | |
|---|---|---|---|
| Year 3 objectives | Units | Year 4 objectives | Units |
| Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure, and record measurements | 3C1, 3D1, 3C2, 3D2, 3C3 | **Choose and use standard metric units and their abbreviations when estimating, measuring and recording length, weight and capacity; know the meaning of 'kilo', 'centi' and 'milli' and, where appropriate, use decimal notation to record measurements (e.g. 1.3 m or 0.6 kg)** | 4C1, 4D1, 4C2, 4D2, 4C3, 4D3 |
| **Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy** | 3C1, 3D1, 3C2, 3C3, 3D3 | Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit | 4C1, 4D1, 4C2, 4D2, 4C3, 4D3 |
| | | Draw rectangles and measure and calculate their perimeters; find the area of rectilinear shapes drawn on a square grid by counting squares | 4D2, 4D3 |
| Read the time on a 12-hour digital clock and to the nearest 5 minutes on an analogue clock; calculate time intervals and find start or end times for a given time interval | 3D1, 3C2, 3D3 | Read time to the nearest minute; use am, pm and 12-hour clock notation; choose units of time to measure time intervals; calculate time intervals from clocks and timetables | 4D1, 4D3 |



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| Handling data strand | | | |
|---|---|---|---|
| Year 3 objectives | Units | Year 4 objectives | Units |
| Answer a question by collecting, organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations; use ICT to create a simple bar chart | 3C1, 3C2, 3C3 | **Answer a question by identifying what data to collect; organise, present, analyse and interpret the data in tables, diagrams, tally charts, pictograms and bar charts, using ICT where appropriate** | 4C1, 4C2, 4C3 |
| **Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion** | 3C1, 3C2 | | |
| | | Compare the impact of representations where scales have intervals of differing step size | 4C2, 4C3 |

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