MATHS

Parent Toolkit

Supporting your child at home

Contents

Supporting Maths at home: Foundation Stage

Maths Challenge Cards

The maths challenge cards are short activity ideas that can fit into your day and will help your child see maths as fun. The cards relate to the different strands of the area of "Learning outcomes": *Calculations and Shapes, Spaces and measures.*

You can repeat each activity as many times as your child wants to. Feel free to change the ideas to suit your child's interests, what you have in your house and their current level of development. If your child wants to represent their thinking on paper let them do so in their own way. For example they might not want to write numbers, but they might want to draw to communicate their mathematical thinking.

We encourage you to share any ideas you have for maths challenges so that our collection of cards can grow and we can learn from one another.

Maths Challenge

Can you sort the cutlery in your house into different sets?

How did you do it?

1

Maths Challenge

Can you add up the numbers on a car registration plate?

Practise writing these numbers at home.

2

Maths Challenge

Can you find 4 different sized shoes in your house and put them in order of size?

What else can you find to order my length?

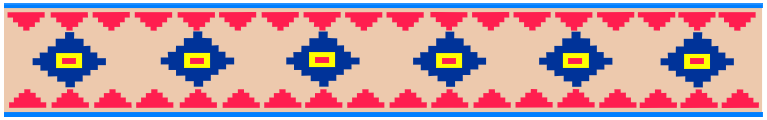
3

Maths Challenge

Find a pattern in your house, e.g. wallpaper, tiles, on the duvet.

Cab you describe it?
(It could be squares/circles….)
See if you can draw your own pattern.

4



Maths Challenge

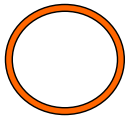
Can you make a repeating pattern using forks and spoons?

Maths Challenge

Can you find something that is a square shape in your house?

Can you find something that is a rectangular shape in your house?

Can you find something that is a circular shape in your house?



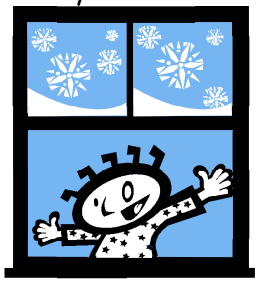
Maths Challenge

How long does it take to have a bath?

How did you work it out?

Maths Challenge

Are you taller or shorter than a door?
Are you taller or shorter than an armchair?
Are you taller or shorter than a window sill?



Maths Challenge

Who has the biggest hands in your family?

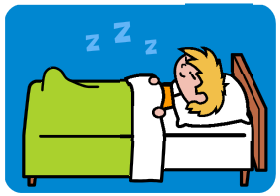
How can you tell?

9

Maths Challenge

How wide is your bed?
How long is your bed?

How can you find out?
Practise writing these numbers at home.



10

Maths Challenge

Who is the tallest person in your house?

Who is the shortest person in your house?

How did you measure them?

11

Maths Challenge

Do 10 jumps in each room of your house. Count each jump to make sure you do 10.

Practise writing number 10 at home.

12

Maths Challenge

Ask your grown up if you can count the coins they have got?

How many are 10p coins?

Practise writing these numbers at home.

Maths Challenge

What numbers can you see in the registration plate of your car?

Which is the smallest number? Which is the largest number?

Practise writing these numbers at home.

Maths Challenge

Do you have a clock in your house?
What is the biggest number you can read on the clock?
What would be the next number?

Practise writing all the numbers that are on the clock.

Maths Challenge

Can you find any numbers in your house?

Practise writing these numbers at home.

Maths Challenge

Count how many drawers there are in your whole house.

Practise writing these numbers at home.

17

Maths Challenge

How many windows are in your house?
How many are upstairs?
How many are downstairs?
Practise writing these numbers at home.

18

Maths Challenge

How many footsteps from
Your house to the bottom of your garden?
Your front door to your bedroom?
Your kitchen to your bathroom?

What happens to the number if you take bigger steps?

Practise writing these numbers at home.

19

Maths Challenge

What is your house number?

Can you think of a smaller number than this?
What number are the numbers of the houses next door?

Practise writing these numbers at home.

Maths Challenge

What numbers are in your phone number?

Which is the biggest number?
Can you put them in order from smallest to biggest?

Practise writing these numbers at home.

Maths Challenge

How many stairs people are in your house?
How many windows are in your house?
How many rooms in your house?

Practise writing these numbers at home.

Maths Challenge

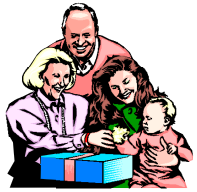
How many strides is it to walk all the way around your garden?

Practise writing these numbers at home.

Maths Challenge

Who are the oldest and youngest people in your family?
How old are they?

Practise writing these numbers at home.



Maths Challenge

How many chairs are in your house?
How many televisions are in your house?

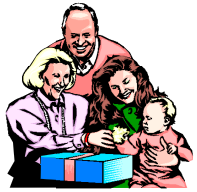
Can you add the two numbers together?

Practise writing these numbers at home.

Maths Challenge

Ask your grown up for their keys. Count the keys on the key ring.

Practise writing these numbers at home.



Maths Challenge

Find a pair of socks for everyone in your house?
How many socks do you have altogether?

Practise writing these numbers at home.

Maths Challenge

Find 5 pairs of socks hide 4 socks how many are left?

Practise writing these numbers at home.

Maths Challenge

Look at one of your books. Can you find and read the numbers that are on each page?
Which is the biggest number?
Which is the smallest number?

Practise writing these numbers at home.

Maths Challenge

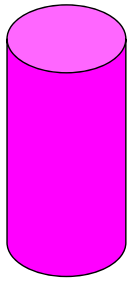
Hide your teddy. Use words to describe where teddy is hidden, e.g. behind, on top, underneath, in between.

Maths Challenge

Ask your grown up to blind fold you. Listen to their instructions and see where you end up!

Maths Challenge

Walk around your house. How many shapes can you see?
Can you find a cube?
Can you find a sphere?
Can you find a cuboid?
Can you find a cylinder?



Maths Challenge

Look in your food cupboard. What is the heaviest food? Which is the lightest? How do you know?

Maths Challenge

Which is heavier?
A teddy or a can of food?
A chair or a toothbrush?
A cushion or a bike?

Maths Challenge

Which is lighter?
A spoon or table?
A handful of grass or a bunch of bananas?
Your biggest toy or your smallest toy?

Maths Challenge

Count how many trees are on your street.
Count how many cars are on your street.

Can you add these two numbers together?
Practise writing these numbers at home.

Maths Challenge

What is the biggest number you can think of?
What is the smallest number you can think of?
Practise writing these numbers at home.

Maths Challenge

On your way to school what numbers do you see?
How many of the numbers can you write down?

Maths Challenge

Can you write numbers from 0 to 10?
Can you find ten things to count in your house?
Practise writing these numbers at home.

Maths Challenge

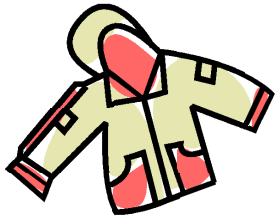
Can you write numbers from 0 to 20?
Can you find ten things to count in your house?
Practise writing these numbers at home.

Maths Challenge

Can you find?
1 toothbrush
2 spoons
3 pegs
4 socks
5 shoes

Maths Challenge

Can you get dressed before your grown up counts to 20?
Can you do your coat up before your grown up counts to 5?



Supporting maths at home: Years 1 and 2

Whatever you do with your child, have a positive attitude towards maths yourself!

Bingo! **What is being taught:** Number recognition	**What you need for this activity?** You will need: paper and pen/pencil and a set of numbers.
	Have children make up a bingo card with a variety of different numbers from 1-90. Make up a master set of numbers on the bingo cards. Pull the numbers from the bag one at a time. The children cross out the correct number on their 'bingo card'. As any number of children can play this at any one time, a prize can be offered to the child that crosses out their numbers first. This game helps children recognise and practise looking for specific numbers. **EXTENSION:** Change the game to make it a big harder, for example instead of writing the number '8' write 'eight' or '7+1'.
Maths yes/no **What is being taught:** Logic Reasoning Communication	**What you need for this activity?** Nothing – just enthusiasm!
	The only rule for this game is that the child can ask you questions but you can only answer yes or no. Practise yes or no questions before so that children know the kind of questions to answer. Think of a number. The aim of the game is for the children to guess the correct number. Children ask a series of questions, for example: Is the number less than 50? Is it odd or even? Is it more than 12 but less than 45? Does it have the number 5 in it? Etc.
Watching your favourite TV show **What is being taught:**	**What you need for this activity?** A newspaper with TV listings
	What time does your favourite TV programme start?

Planning Time	How long does the TV programme last? What time does the next TV programme start? If you watched your favourite TV programme and the programme after, how much time would you be spending watching TV? What TV programme starts when it is your bedtime?
Fridge magnets **What is being taught:** Addition Subtraction Multiplication Division	**What you need for this activity?** Some magnetic numbers and a fridge/magnet surface Is your fridge covered in magnetic letters and numbers? How about setting your child a number task to complete on the fridge every morning? Your children can then set you a number task to complete. Just make sure you have all the numbers you need to answer the puzzles.
Calendar game **What is being taught with this game?** Counting, Patterns, Sets **Language to use:** Yesterday, today, tomorrow, weekend, the day before, the day after	**What do you need?** A calendar/diary and a pen/pencil Do you have a calendar in your home? Mark on it the end of term for school. Talk to your children about how many school days they have left before the next holiday, practice counting in 2s, practice counting backwards. Challenge: how many weeks is that? This activity can be done with any event or date coming up that interests your children. Questions to ask: How many sleeps until…? How many days? How many weekends? What are the days of the week? What are the months of the year? What is the 2nd day of the week? Etc.

Supermarket game **What is being taught with this game?** Counting, understanding language of different sizes. **Language to use:** Small, big nearer, farther, heavier, shorter, longer	**What do you need?** Nothing, it can be played on any family trip to the shops. In the shop: Get your children to help at various different areas with the supermarket. You could ask your children to: • Pick 4 bananas • Choose 5 red apples and 2 green apples • Choose and estimate 1kg of potatoes. You the supermarket weighing scales to check. • Pick the cheapest tin of beans • Choose 4 different rolls from pick-and-mix bakery counter This game can be played in any way according to what you need to buy.

Singing	**What do you need?**

songs/rhymes **What is being taught with this game?** Number recognition, sequencing	nothing There are lots of rhymes and number songs you can sing with your children. Why not try: 10 green bottles hanging on the wall, 10 green bottles hanging on the wall, And if one green bottle should accidently fall, There'll be… 9 green bottles hanging on the wall. 1,2,3,4,5 Once I caught a fish alive 6,7,8,9,10 Then I let it go again, Why did you let it go, Because it bit my finger so, Which finger did it bite? This little finger on the right.

Play board games **What is being taught with this game?** Counting, sequencing, addition, subtraction, patterns **Language to use:** Move forward, move backwards	**What do you need?** A selection of board games Let the children roll the dice and work out the number of moves they have to make. Games that are particularly good for numeracy skills are: Monopoly Battleships Dominoes Tri-ominos Uno Rummikub Magic cauldron game

Car park game **What is being taught with this game?** Counting, travelling time **Language to use:** Addition, money	**In the car park** Play a game with the children to remember where the car is parked – how many rows away from the supermarket front door and how many spaces along in the row? If you are getting the bus to the supermarket, read the timetable with the children and ask them to remember the time for catching the bus back. How many minutes do you have to shop? **Using money** You can also play the supermarket game at home with toy money, coins and a till. You can also use money to help children reach a set amount. Give them a selection of coins and ask them to make up, for example, 99p to buy milk. Which coins can they use? Will they get any change, etc?

Read books with a number theme	**What do you need for this activity?**
	Access to a public library. These books can all be barrowed free of charge from your local library.
What is being	Reading books with a strong numeracy or counting theme. Examples:

taught with this game?	The Very Hungry Caterpillar by Eric Carle] Maths Curse by Jon Scieszka and Lane Smith Einstein, The Girl Who Hated Maths by John Agard One More Sheep by Mij Kelly and Russell Ayto The Terrific Times tables book by Kate Petty and Jennie Maizels Ten Little Rubber Ducks by Eric Carle How do Dinosaurs Count to Ten? By Jane Yolen and Mark Teague.
Play cards with your children	**What do you need for this activity?**
	A set of playing cards.
What is being taught with this game? Sequencing Patterns Recognising numbers	Simple games like snap and patience help with sequencing and patterns in numbers. When playing snap get the children to add up the snap cards e.g. snap on two eights. 'What do you get if you add two eights together?'etc.
Play darts with your children	**What do you need for this activity?**
	A set of darts and a dartboard
What is being taught with this game? Counting Subtraction Addition Language to use Double, trebles, bull's-eye	Darts is also a fun to play numeracy games with your children. Get them to throw the dart, add up their score and subtract from 501. They will need help with this. It is okay to use a pencil and paper but try to get the children to work this out in their head- don't let them use a calculator!
Playing snooker/pool with your children	**What do you need for this activity?**
	Access to a pool/snooker table
What is being taught with this game? Addition Patterns Sequencing Numbers linked to colours	Snooker/pool is a great way to teach children all about numbers and sequencing and to practise addition. Teach your children how much each coloured ball is worth. Add up scores for each ball potted.
<u>Newspaper Game</u>	**What do you need for this activity?** A selection of newspapers.
What is being taught with this activity? Number recognition	Try to spot numbers in the stories. What page number are we on? What number will come next? You could have a bonus number of the day. The first person to spot the bonus number in a story wins. The person to see the biggest/smallest number in the newspaper wins the game!
Journey numbers	**What do you need for this activity?** Paper, pencils/pens
What is being	Have a sheet of paper with numbers on it and children have to cross off the numbers they

taught with this activity? Number recognition	spot on the journey. Numbers can come from road signs, buses, number plates etc. Count the number of blue/red/yellow etc cars. How many more red cars were there than blue cars? How many fire engines did you see?
Hobbies **What is being taught with this activity?** Sequencing Counting	**What do you need for this activity?** Depending on the children's hobby, some access to materials to support the hobby, e.g. list of football players in a favourite team
	Try to talk to them about numbers within their hobby. Who is the top goal scorer? How many goals have they scored this season? Who wears the number 7 shirt? How many teams are there in the league? How many players are there in a team… 2 teams… on the pitch? What numbers from 1-30 are not on the football pitch?
Baking and Cooking **What is being taught with this activity?** Measurement **Language to use:** Heavier, lighter, more, less, thick, thin	**What do you need for this activity?** Baking materials, scales Food at tea-time
	If you are making a family meal or baking something invite children to help. Children can read the recipe, weigh out the ingredients, check cooking times etc. Start with simple recipes with only a few ingredients, for example pancakes. Let children help dish up food at meal times. For example, how many sausages does each person get? Can you put half the pizza on each plate?
Maps and Phones **What is being taught with this activity?** Distance Position, direction and movement Number recognition	**What do you need for this activity?** A selection of maps; mobile phone; calculator on a phone; a maps app on a mobile phone/tablet
	Use maps to find your way about. Which road are we on now? Which way do we need to go now? Where are we on the map? Estimate how long the trip will take or how far you have travelled. Plan a journey to a friend's house… school… the shops etc. Use the mobile phone to enter numbers.

Useful websites:

http://www.bbc.co.uk/schools/websites/4_11/site/numeracy.shtml

http://www.primaryhomeworkhelp.co.uk/maths/

Supporting maths at home: Years 3 and 4

Children whose parents show an interest in and enthusiasm for mathematics around the home will be more likely to develop that enthusiasm themselves.

Everyday situations:

- **Cooking** – weighing and measuring ingredients.

  Multiplying and dividing take a recipe for 8 people and then make it for 4 people.

- **Telling the time** – what time do we leave for school, what time do we have dinner etc.
- **Shopping** - giving children money to spend at the shops, counting how much change you have in your purse, adding the cost of 2 items in the shop, calculating change when shopping.
- **The world around us** – identifying shapes and patterns in the world around us looking at the shapes of containers in your shopping trolley, identifying shapes in buildings, looking at symmetrical patterns on drain covers.

Play activities/games:

- Card games such as pontoon, uno, etc.
- Any games involving calculating scores, e.g. Scrabble, Monopoly, quoits, darts, bowling.
- Games involving strategic thinking/logic, e.g. connect four, chinese checkers, solitaire, draughts, chess, battleships or dominoes
- Specialized computer games designed for using and developing maths.

Working with a budget - Give your child a budget to plan their birthday party, to make up party bags, to buy the families Christmas presents.

The answer – give the children the answer and they generate the question e.g. the answer is 20 what is the question? 4 x 5, 36-16, 15.4 + 4.6

20 questions- Think of a number between 0-20. You have 20 questions to guess what my number is e.g. is it an odd number? You can only answer yes or no.

Don't roll a 6 – roll a die and then keep adding the numbers, if you roll a 6 you can shout 'don't roll a 6!' If you roll a 6 you have to start at 0 again. How high can you go? This can also be played for subtraction starting at 50 or 100 every time you roll a 6 you go back to the starting number. How low can you go?

Rhymes

- Make up rhymes together to help your child to remember the harder times-tables facts, e.g.
- 6 x 7 = 42 phew! 7 x 7 = 49 fine! 6 x 8 = 48 great!

Mental activities:

- **Counting** practise counting forwards and backwards from any given number firstly in 1s and 10s then progressing to 5, 2, 3 etc.
- **Number bonds** for every number to 20. Practise recalling number bonds for each number to 20 e.g. 12 + 5 = 17, 7 + 6 = 13
- **Doubles** practise doubles to 20.

- **Adding** roll 2 dice when playing board games such as snakes and ladders add the digits on the dice.
- **Times tables** chant the times tables on the way to school each day, quick fire tables questions, sing the tables to CDs.

Websites:

http://www.bbc.co.uk/bitesize/ks2/maths/

http://uk.ixl.com/math/year-3

http://uk.ixl.com/math/year-4

http://primarygamesarena.com/Year-3

http://primarygamesarena.com/Year-4

http://mrnussbaum.com/mathcode/

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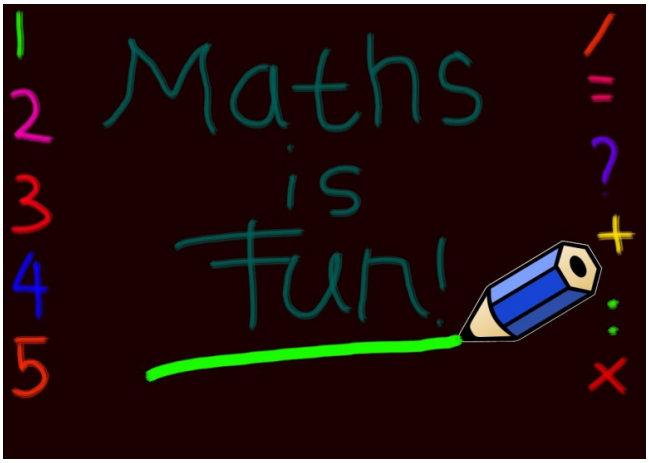


Supporting maths at home: Years 5 and 6

Whatever you do with your child, have a positive attitude towards maths yourself!

Everyday situations:

- Weighing, measuring capacity and timing when cooking. Converting a recipe for 4 people to one for 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? Many children will still need practice with reading clock times, particularly minutes past and minutes to the hour.
- 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 house prices from newspaper house sales pages.
- Working out how much petrol will be used on a journey, working out average speed for a journey, costing journeys or holidays etc.

- Journeys

Use the chart in the front of a road atlas that tells you the distance between places.

- Find the nearest place to you.
- Ask your child to work out how long it would take to travel from this place to some other places in England if you travelled at an average of 60 miles per hour, i.e. 1 mile per minute, e.g.

York to Preston: 90 miles 1 hour 30 minutes

York to Dover: 280 miles 4 hours 40 minutes

Encourage your child to count in 60s to work out the answers mentally.

- Extend this by asking questions like "What if you travelled at 30 mph? What if we started at London?

- TV addicts

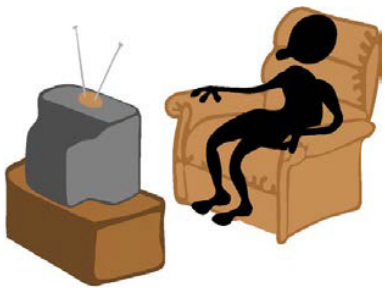
Ask your child to keep a record of how long he / she watches TV each day for a week. Then ask him / her to do the following:-

♦ Work out the total watching time for the week.

♦ Work out the average watching time for a day

(that is, the total time divided by 7).

Instead of watching TV, you could ask them to keep a record of time spent eating meals, or playing outdoors, or anything else they do each day. Then work out the daily average.



Play activities/games:

- Card games such as sevens, cribbage, pontoon etc.
- Any games involving calculating scores, e.g. Scrabble, Monopoly, quoits, darts, bowling.
- Beat the calculator. In pairs, one with a calculator, one without, each works out the answer to a calculation aiming for the one without the calculator to say the answer first.
- Games involving strategic thinking/logic, e.g. draughts, chess, mastermind.
- Specialised computer games designed for using and developing maths.
- One million pounds

Assume you have £1 000 000 to spend or give away.

Plan with your child what to do with it, down to the last penny.

- Animals

  - Take turns to think of an animal.
  - Use an alphabet code, A = 1, B = 2, C = 3... up to Z = 26.
  - Find the numbers for the first and last letters of your animal, e.g. for a TIGER, T = 20, and I = 9,
  - Multiply the two numbers together, e.g. 20 x 9 = 180.
  - The person with the biggest answer scores a point.
  - The winner is the first to get 5 points.
  - When you play again you could think of names, food, countries

- Rhymes

  - Make up rhymes together to help your child to remember the harder times-tables facts, e.g.
  - 6 x 7 = 42 phew! 7 x 7 = 49 fine! 6 x 8 = 48 great!

Mental activities:

- Practising and developing knowledge of addition and subtraction facts within 20 (7+8, 13-5 etc.) and multiplication and division facts to 10 x 10 (6x7, 35/5 etc.) Make it into a game if possible, e.g. have a set of cards numbered 1-10, pick a number such as 4, say 4 times the number on the card as each is turned over, keep all the cards you get right. Beat the calculator as above. On a journey, adult passenger times response, try to beat your own time.
- Ask 'progressive' calculations, e.g. 7 + 6, 17 + 6, 27 + 6, 47 + 6, 147 + 6; 5 x 2, 50 x 2, 500 x 2, 500 x 20.
- Working out 2-digit additions and subtractions, multiplying and dividing 2-digit numbers by 1 digit numbers mentally. Talk about how to make it easier, e.g. for 28 + 15, call it 30 add 13 and that's easy; for 16 x 4, double 16, then double 32.
- Open- ended activities, e.g. The answer's 25, what's the question? How can you use combinations of 3 and 6 to make different numbers? (Use each number as many times as you like with addition, subtraction, multiplication or division.)

- 'The answer is 10 (or any number), what's the question? '

Possible responses:

- 8 plus 2
- 1 million divided by one hundred thousand
- 5 x 2
- 25 - 15
- 2.5 times 4
- the number before 11
- 9999 subtract 9989
- the square root of 100

Websites:

http://www.bbc.co.uk/bitesize/ks2/maths/

http://uk.ixl.com/math/year-5

http://uk.ixl.com/math/year-6

http://primarygamesarena.com/Year-6

http://primarygamesarena.com/Year-5

http://mrnussbaum.com/mathcode/

Calculations Policy

We are a rights respecting school:
Article 28: (Right to education): All children have the right to a primary education.
Article 29 (Goals of education): Children's education should develop each child's personality, talents and abilities to the fullest.

Introduced by RW **2010**
Reviewed by math's working party **January 2013**
Review date **December 2015**

Aims
The purpose of the calculations policy at Thameside Primary School is to ensure consistency in the teaching of mathematics throughout the school. We also aim to raise standards by ensuring that pupils know what they are able to do and what their next steps are.

PROGRESSION THROUGH CALCULATIONS FOR ADDITION

MENTAL CALCULATIONS
(ongoing)
These are a **selection** of mental calculation strategies:
See NNS Framework Section 5, pages 30-41 and Section 6, pages 40-47

Mental recall of number bonds
6 + 4 = 10 □ + 3 = 10
25 + 75 = 100 19 + □ = 20

Use near doubles
6 + 7 = double 6 + 1 = 13

Addition using partitioning and recombining
34 + 45 = (30 + 40) + (4 + 5) = 79

Counting on or back in repeated steps of 1, 10, 100, 1000
86 + 57 = 143 (by counting on in tens and then in ones)
460 - 300 = 160 (by counting back in hundreds)

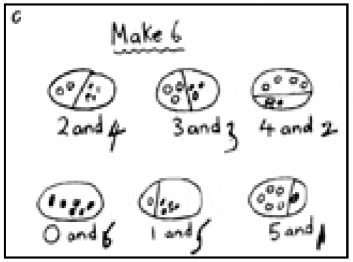
Add the nearest multiple of 10, 100 and 1000 and adjust
24 + 19 = 24 + 20 – 1 = 43
458 + 71 = 458 + 70 + 1 = 529

Use the relationship between addition and subtraction
36 + 19 = 55 19 + 36 = 55
55 – 19 = 36 55 – 36 = 19

MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED. THEY ARE NOT REPLACED BY WRITTEN METHODS.
THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

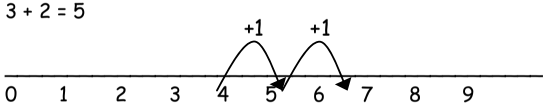
YR and Y1

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, etc.



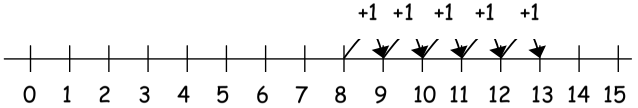
They use numberlines and practical resources to support calculation and teachers *demonstrate* the use of the numberline.

3 + 2 = 5

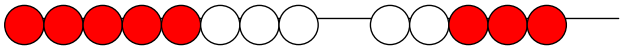


Children then begin to use numbered lines to support their own calculations using a numbered line to count on in ones.

8 + 5 = 13



Bead strings or bead bars can be used to illustrate addition including bridging through ten by counting on 2 then counting on 3.

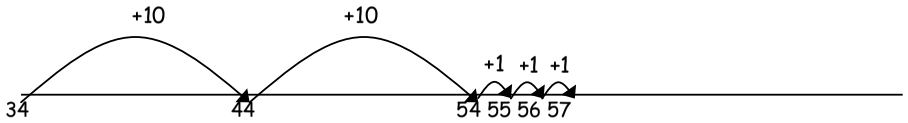


Y2

Children will begin to use 'empty number lines' themselves starting with the larger number and counting on.

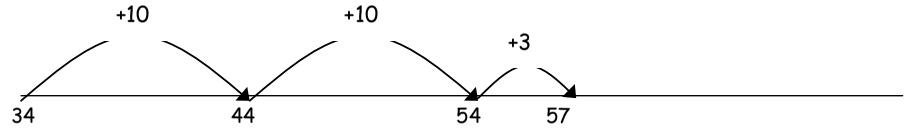
✓ First counting on in tens and ones.

34 + 23 = 57



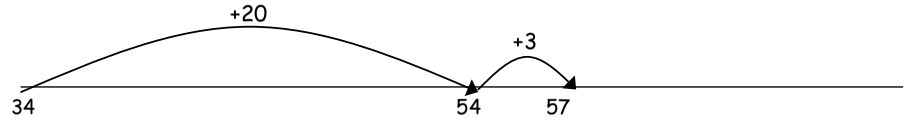
✓ Then helping children to become more efficient by adding the units in one jump (by using the known fact 4 + 3 = 7).

34 + 23 = 57



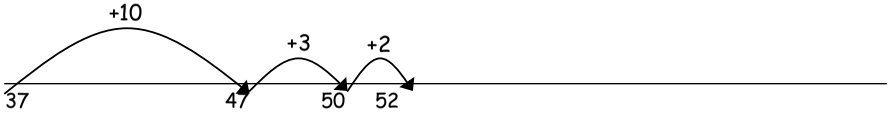
✓ Followed by adding the tens in one jump and the units in one jump.

34 + 23 = 57



✓ Bridging through ten can help children become more efficient.

37 + 15 = 52

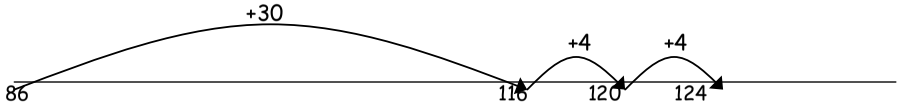


Y3

Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate.

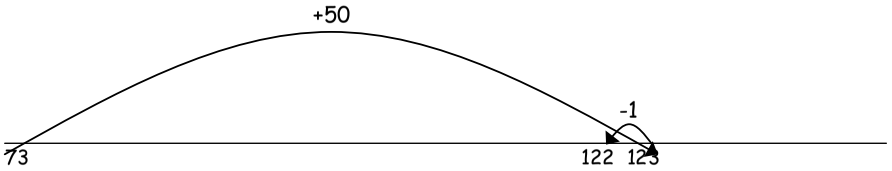
✓ Count on from the largest number irrespective of the order of the calculation.

38 + 86 = 124



✓ Compensation

49 + 73 = 122



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

Option 1 – Adding most significant digits first, then moving to adding least significant digits.

```
  67
+ 24
  80  (60 + 20)
  11  ( 7 + 4)
  91
```

```
  267
+  85
  200
  140  (60 + 80)
   12  ( 7 +  5)
  352
```

Moving to adding the least significant digits first in preparation for 'carrying'.

```
  67
+ 24
  11  ( 7 + 4)
  80  (60 + 20)
  91
```

```
  267
+  85
  12  ( 7 + 5)
 140  (60 + 80)
  200
  352
```

Option 2 - Adding the least significant digits first

```
  67
+ 24
  11 ( 7 + 4)
  80 (60 + 20)
  91
```

```
  267
+  85
   12 ( 7 + 5)
  140 (60 + 80)
  200
  352
```

Y4

From this, children will begin to carry below the line.

```
  625
+  48
  673
   1
```

```
  783
+  42
  825
   1
```

```
  367
+  85
  452
  11
```

Using similar methods, children will:

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;*
- ✓ *know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p.*

Y5

Children should extend the carrying method to numbers with at least four digits.

```
  587
+ 475
 1062
  11
```

```
  3587
+  675
  4262
  111
```

Using similar methods, children will:

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more decimal fractions with up to three digits and the same number of decimal places;*
- ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m – 280 cm.*

Y6

Children should extend the carrying method to number with any number of digits.

```
  7648
+ 1486
  9134
  111
```

```
  6584
+ 5848
 12432
  111
```

```
    42
  6432
   786
     3
+ 4681
 11944
 121
```

Using similar methods, children will

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more decimal fractions with up to four digits and either one or two decimal places;*
- ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 401.2 + 26.85 + 0.71.*

+ - + - + - + - + - + - +

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

Children should not be made to go onto the next stage if:

1) **they are not ready.**
2) **they are not confident.**

Children should be encouraged to approximate their answers before calculating.
Children should be encouraged to check their answers after calculation using an appropriate strategy.
Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

PROGRESSION THROUGH CALCULATIONS FOR SUBTRACTION

MENTAL CALCULATIONS
(ongoing)
These are a **selection** of mental calculation strategies:
See NNS Framework Section 5, pages 30-41 and Section 6, pages 40-47

Mental recall of addition and subtraction facts
10 – 6 = 4 17 - □ = 11
20 - 17 = 3 10 - □ = 2

Find a small difference by counting up
82 – 79 = 3

Counting on or back in repeated steps of 1, 10, 100, 1000
86 - 52 = 34 (by counting back in tens and then in ones)
460 - 300 = 160 (by counting back in hundreds)

Subtract the nearest multiple of 10, 100 and 1000 and adjust
24 - 19 = 24 - 20 + 1 = 5
458 - 71 = 458 - 70 - 1 = 387

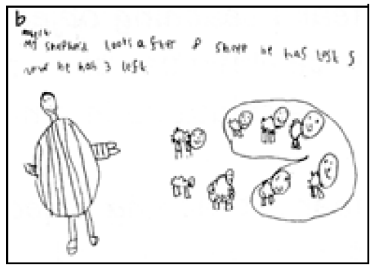
Use the relationship between addition and subtraction
36 + 19 = 55 19 + 36 = 55
55 – 19 = 36 55 – 36 = 19

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

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

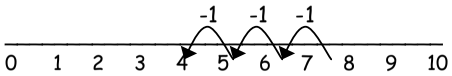
YR and Y1

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures etc.

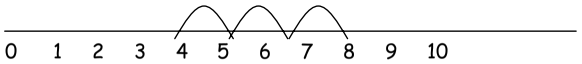


They use numberlines and practical resources to support calculation. Teachers *demonstrate* the use of the numberline.

6 – 3 = 3

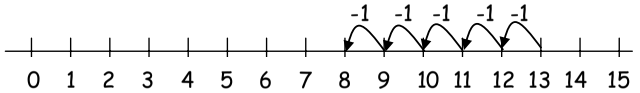


The numberline should also be used to show that 6 - 3 means the 'difference between 6 and 3' or 'the difference between 3 and 6' and how many jumps they are apart.



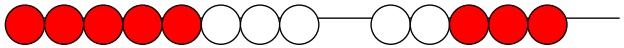
Children then begin to use numbered lines to support their own calculations - using a numbered line to count back in ones.

13 – 5 = 8



Bead strings or bead bars can be used to illustrate subtraction including bridging through ten by counting back 3 then counting back 2.

13 – 5 = 8



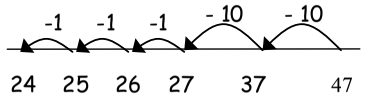
Y2

Children will begin to use empty number lines to support calculations.

Counting back

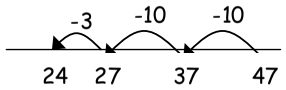
✓ First counting back in tens and ones.

47 – 23 = 24



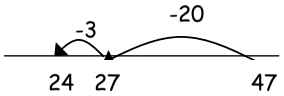
✓ Then helping children to become more efficient by subtracting the units in one jump (by using the known fact 7 – 3 = 4).

47 – 23 = 24



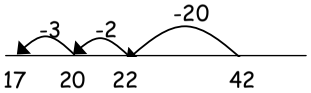
✓ Subtracting the tens in one jump and the units in one jump.

47 – 23 = 24



✓ Bridging through ten can help children become more efficient.

42 – 25 = 17



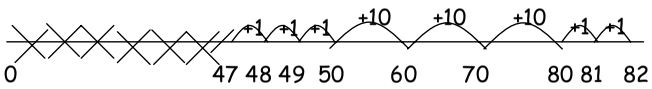
Counting on

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc, it can be more efficient to count on.

Count up from 47 to 82 in jumps of 10 and jumps of 1.

The number line should still show 0 so children can cross out the section from 0 to the smallest number. They then associate this method with 'taking away'.

82 - 47



Help children to become more efficient with counting on by:

✓ Subtracting the units in one jump;
✓ Subtracting the tens in one jump and the units in one jump;
✓ Bridging through ten.

Y3

Children will continue to use empty number lines with increasingly large numbers.

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

Partitioning and decomposition

This process should be demonstrated using arrow cards to show the partitioning and base 10 materials to show the decomposition of the number.

NOTE When solving the calculation 89 – 57, children should know that 57 **does NOT EXIST AS AN AMOUNT** it is what you are subtracting from the other number. Therefore, when using base 10 materials, children would need to count out only the 89.

$$\begin{array}{rcl} 89 & = & 80 + 9 \\ -\ 57 & & 50 + 7 \\ & & 30 + 2 = 32 \end{array}$$

Initially, the children will be taught using examples that do not need the children to exchange.

From this the children will begin to exchange.

$$\begin{array}{rcl} 71 & = & \quad = \\ -\ 46 & & \end{array}$$

Step 1
$$\begin{array}{rl} & 70 + 1 \\ -\ & 40 + 6 \end{array}$$

Step 2
$$\begin{array}{rl} & 60 + 11 \\ -\ & 40 + 6 \\ & 20 + 5 = 25 \end{array}$$

The calculation should be read as e.g. take 6 from 1.

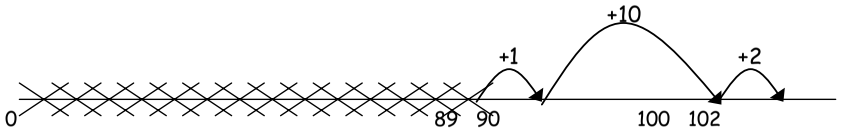
This would be recorded by the children as

$$\begin{array}{rl} & {}^{60}\not{7}0 + {}^{1}1 \\ -\ & 40 + 6 \\ & 20 + 5 = 25 \end{array}$$

Children should know that units line up under units, tens under tens, and so on.

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

102 – 89 = 13



Y4

Partitioning and decomposition

754 =
- 86

Step 1 700 + 50 + 4
- 80 + 6

Step 2 700 + 40 + 14 *(adjust from T to U)*
- 80 + 6

Step 3 600 + 140 + 14 *(adjust from H to T)*
- 80 + 6
600 + 60 + 8 = 668

This would be recorded by the children as

600 140
~~700~~ + ~~50~~ + ^{1}4
- 80 + 6
600 + 60 + 8 = 668

Decomposition

614 1
~~7~~~~5~~4
- 86
668

Children should:

- ✓ *be able to subtract numbers with different numbers of digits;*
- ✓ *using this method, children should also begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds;*
- ✓ *know that decimal points should line up under each other.*

For example:

£8.95 = 8 + 0.9 + 0.05
-£4.38 - 4 + 0.3 + 0.08

= 8 + 0.8 + 0.15 *(adjust from T to U)*
- 4 + 0.3 + 0.08
4 + 0.5 + 0.07

= £4.57

leading to

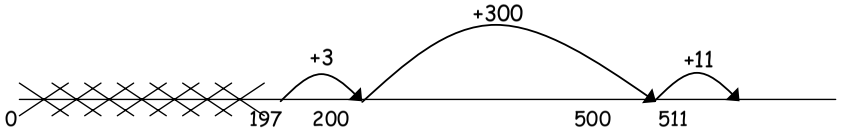
^{1}
8.85
- 4.38

Alternatively, children can set the amounts to whole numbers, i.e. 895 – 438 and convert to pounds after the calculation.

NB If your children have reached the concise stage they will then continue this method through into years 5 and 6. They will not go back to using the expanded methods.

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

511 – 197 = 314



Y5

Partitioning and decomposition

Step 1 754 = 700 + 50 + 4
- 286 - 200 + 80 + 6

Step 2 700 + 40 + 14 *(adjust from T to U)*
- 200 + 80 + 6

Step 3 600 + 140 + 14 *(adjust from H to T)*
- 200 + 80 + 6
400 + 60 + 8 = 468

This would be recorded by the children as

600 140
~~700~~ + ~~50~~ + ^{1}4
- 200 + 80 + 6
400 + 60 + 8 = 468

Decomposition

```
  614 1
   7 7 4
 - 2 8 6
   4 6 8
```

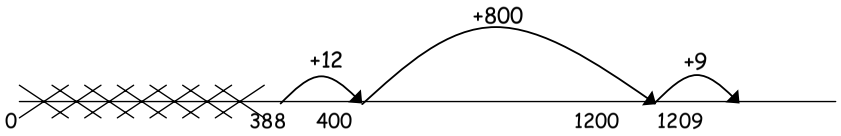
Children should:

- ✓ *be able to subtract numbers with different numbers of digits;*
- ✓ *begin to find the difference between two decimal fractions with up to three digits and the same number of decimal places;*
- ✓ *know that decimal points should line up under each other.*

NB If your children have reached the concise stage they will then continue this method through into year 6. They will not go back to using the expanded methods.

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

1209 – 388 = 821



Y6

Decomposition

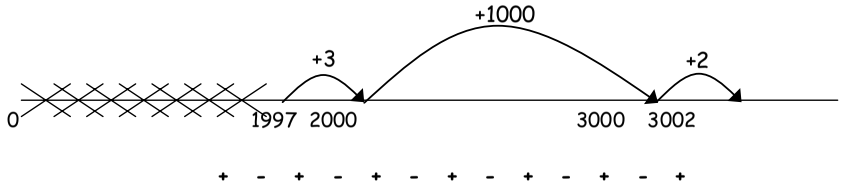
```
  5 13 1
   6 4 6 7
 - 2 6 8 4
   3 7 8 3
```

Children should:

- ✓ *be able to subtract numbers with different numbers of digits;*
- ✓ *be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places;*
- ✓ *know that decimal points should line up under each other.*

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

3002 – 1997 = 1005



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

Children should not be made to go onto the next stage if:

3) **they are not ready.**
4) **they are not confident.**

Children should be encouraged to approximate their answers before calculating.
Children should be encouraged to check their answers after calculation using an appropriate strategy.
Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

PROGRESSION THROUGH CALCULATIONS FOR MULTIPLICATION

MENTAL CALCULATIONS
(ongoing)
These are a **selection** of mental calculation strategies:
See NNS Framework Section 5, pages 52-57 and Section 6, pages 58-65

Doubling and halving
Applying the knowledge of doubles and halves to known facts.
e.g. 8 x 4 is double 4 x 4

Using multiplication facts

Tables should be taught everyday from Y2 onwards, either as part of the mental oral starter or other times as appropriate within the day.

Year 2
- 2 times table
- 5 times table
- 10 times table

Year 3
- 2 times table
- 3 times table
- 4 times table
- 5 times table
- 6 times table
- 10 times table

Year 4 Derive and recall all multiplication facts up to 10 x 10

Years 5 & 6 Derive and recall quickly all multiplication facts up to 10 x 10.

Using and applying division facts
Children should be able to utilise their tables knowledge to derive other facts.
e.g. If I know 3 x 7 = 21, what else do I know?
30 x 7 = 210, 300 x 7 = 2100, 3000 x 7 = 21 000, 0.3 x 7 = 2.1 etc

Use closely related facts already known
13 x 11 = (13 x 10) + (13 x 1)
= 130 + 13
= 143

Multiplying by 10 or 100
Knowing that the effect of multiplying by 10 is a shift in the digits one place to the left.
Knowing that the effect of multiplying by 100 is a shift in the digits two places to the left.

Partitioning
23 x 4 = (20 x 4) + (3 x 4)
= 80 + 12
= 102

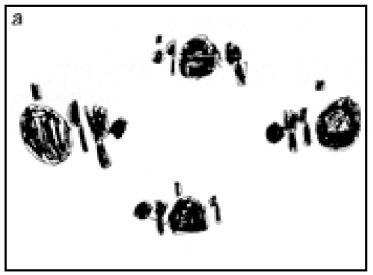
Use of factors
8 x 12 = 8 x 4 x 3

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

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

YR and Y1

Children will experience equal groups of objects and will count in 2s and 10s and begin to count in 5s. They will work on practical problem solving activities involving equal sets or groups.



Y2

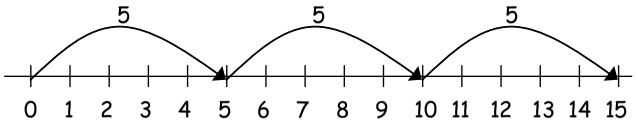
Children will develop their understanding of multiplication and use jottings to support calculation:

✓ **Repeated addition**

3 times 5 is 5 + 5 + 5 = 15 or 3 lots of 5 or 5 x 3

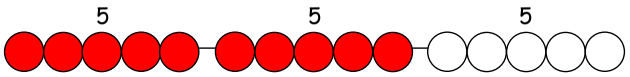
Repeated addition can be shown easily on a number line:

5 x 3 = 5 + 5 + 5



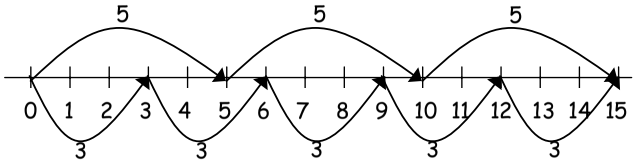
and on a bead bar:

5 x 3 = 5 + 5 + 5



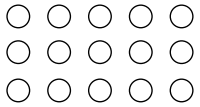
✓ **Commutativity**

Children should know that 3 x 5 has the same answer as 5 x 3. This can also be shown on the number line.



✓ **Arrays**

Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.



5 x 3 = 15

3 x 5 = 15

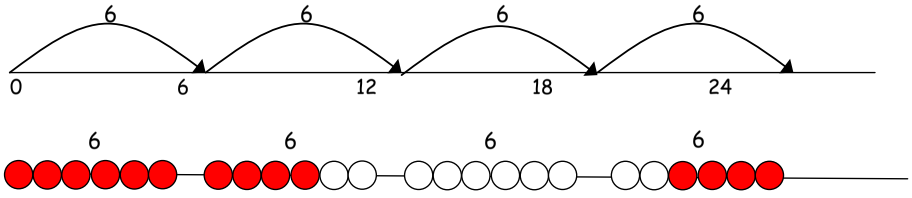
Y3

Children will continue to use:

✓ **Repeated addition**

4 times 6 is 6 + 6 + 6 + 6 = 24 or 4 lots of 6 or 6 x 4

Children should use number lines or bead bars to support their understanding.



✓ **Arrays**

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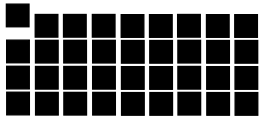


9 x 4 = 36

9 x 4 = 36

Children will also develop an understanding of

✓ **Scaling**

e.g. Find a ribbon that is 4 times as long as the blue ribbon

5 cm

20 cm

✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

□ x 5 = 20 3 x △ = 18 □ x O = 32

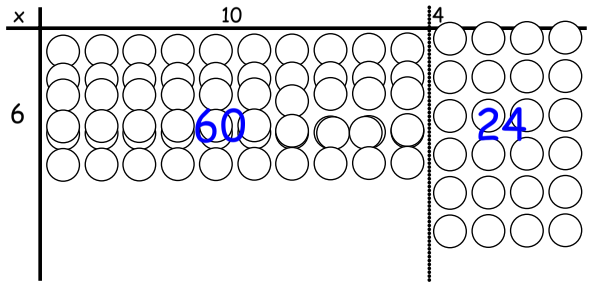
✓ **Partitioning**

38 x 5 = (30 x 5) + (8 x 5)
= 150 + 40
= 190

NNS Section 5 page 47

Y4

Children will continue to use arrays where appropriate leading into the grid method of multiplication.



(6 x 10) + (6 x 4)

60 + 24

84

Grid method

TU x U
(Short multiplication – multiplication by a single digit)

23 x 8

Children will approximate first
23 x 8 is approximately 25 x 8 = 200

x	20	3
8	160	24

160
+ 24
184

Y5

Grid method

HTU x U
(Short multiplication – multiplication by a single digit)

346 x 9

Children will approximate first
346 x 9 is approximately 350 x 10 = 3500

x	300	40	6
9	2700	360	54

2700
+ 360
+ 54
3114
1 1

TU x TU
(Long multiplication – multiplication by more than a single digit)

72 x 38

Children will approximate first
72 x 38 is approximately 70 x 40 = 2800

x	70	2
30	2100	60
8	560	16

2100
+ 560
+ 60
+ 16
2736
1

Using similar methods, they will be able to multiply decimals with one decimal place by a single digit number, approximating first. They should know that the decimal points line up under each other.

e.g. 4.9 x 3

Children will approximate first
4.9 x 3 is approximately 5 x 3 = 15

x	4	0.9
3	12	2.7

12
+ 2.7
14.7

Y6

ThHTU x U
(Short multiplication – multiplication by a single digit)

4346 x 8

Children will approximate first
4346 x 8 is approximately 4346 x 10 = 43460

x	4000	300	40	6
8	32000	2400	320	48

32000
+ 2400
+ 320
+ 48
34768

HTU x TU
(Long multiplication – multiplication by more than a single digit)

372 x 24

Children will approximate first
372 x 24 is approximately 400 x 25 = 10000

x	300	70	2
20	6000	1400	40
4	1200	280	8

6000
+ 1400
+ 1200
+ 280
+ 40
+ 8
8928

Using similar methods, they will be able to multiply decimals with up to two decimal places by a single digit number and then two digit numbers, approximating first. They should know that the decimal points line up under each other.

For example:

4.92 x 3

Children will approximate first
4.92 x 3 is approximately 5 x 3 = 15

x	4	0.9	0.02
3	12	2.7	0.06

12
+ 0.7
+ 0.06
12.76

+ - + - + - + - + - + - +

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

Children should not be made to go onto the next stage if:

5) **they are not ready.**
6) **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 written methods.

PROGRESSION THROUGH CALCULATIONS FOR DIVISION

MENTAL CALCULATIONS
(ongoing)
These are a **selection** of mental calculation strategies:
See NNS Framework Section 5, pages 52-57 and Section 6, pages 58-65

Doubling and halving
Knowing that halving is dividing by 2

Deriving and recalling division facts

Tables should be taught everyday from Y2 onwards, either as part of the mental oral starter or other times as appropriate within the day.

Year 2
- 2 times table
- 5 times table
- 10 times table

Year 3
- 2 times table
- 3 times table
- 4 times table
- 5 times table
- 6 times table
- 10 times table

Year 4 Derive and recall division facts for all tables up to 10 x 10

Year 5 & 6 Derive and recall quickly division facts for all tables up to 10 x 10

Using and applying division facts
Children should be able to utilise their tables knowledge to derive other facts.
e.g. If I know 3 x 7 = 21, what else do I know?
30 x 7 = 210, 300 x 7 = 2100, 3000 x 7 = 21 000, 0.3 x 7 = 2.1 etc

Dividing by 10 or 100
Knowing that the effect of dividing by 10 is a shift in the digits one place to the right.
Knowing that the effect of dividing by 100 is a shift in the digits two places to the right.

Use of factors
378 ÷ 21 378 ÷ 3 = 126 378 ÷ 21 = 18
126 ÷ 7 = 18

Use related facts
Given that 1.4 x 1.1 = 1.54
What is 1.54 ÷ 1.4, or 1.54 ÷ 1.1?

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

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

YR and Y1

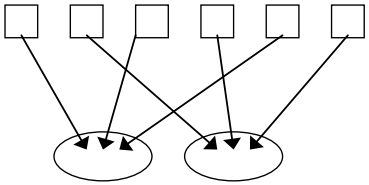
Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and later in 5s.

Y2

Children will develop their understanding of division and use jottings to support calculation

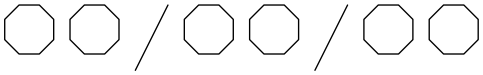
✓ **Sharing equally**

6 sweets shared between 2 people, how many do they each get?



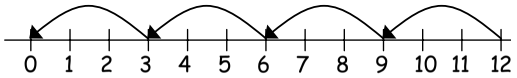
✓ **Grouping or repeated subtraction**

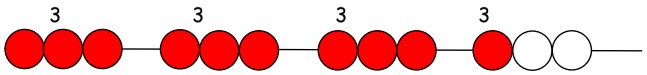
There are 6 sweets, how many people can have 2 sweets each?



✓ **Repeated subtraction using a number line or bead bar**

12 ÷ 3 = 4





The bead bar will help children with interpreting division calculations such as 10 ÷ 5 as 'how many 5s make 10?'

✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

□ ÷ 2 = 4 20 ÷ △ = 4 □ ÷ △ = 4

Y3

Ensure that the emphasis in Y3 is on grouping rather than sharing.

Children will continue to use:

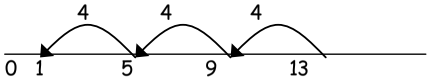
✓ **Repeated subtraction using a number line**

Children will use an empty number line to support their calculation.

24 ÷ 4 = 6

Children should also move onto calculations involving remainders.

13 ÷ 4 = 3 r 1



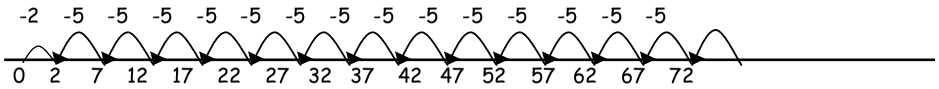
✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

26 ÷ 2 = □ 24 ÷ △ = 12 □ ÷ 10 = 8

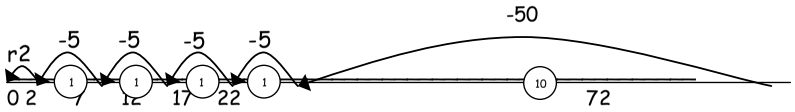
Y4

Children will develop their use of repeated subtraction to be able to subtract multiples of the divisor. Initially, these should be multiples of 10s, 5s, 2s and 1s – numbers with which the children are more familiar.

72 ÷ 5



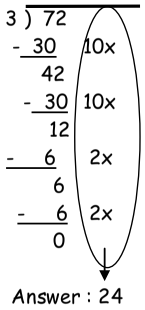
Moving onto:



Then onto the vertical method:

Short division TU ÷ U

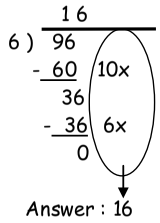
72 ÷ 3



Answer : 24

Leading to subtraction of other multiples.

96 ÷ 6



Answer : 16

Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example 62 ÷ 8 is 7 remainder 6, but whether the answer should be rounded up to 8 or rounded down to 7 depends on the context.

e.g. I have 62p. Sweets are 8p each. How many can I buy?
Answer: 7 (the remaining 6p is not enough to buy another sweet)

Apples are packed into boxes of 8. There are 62 apples. How many boxes are needed?
Answer: 8 (the remaining 6 apples still need to be placed into a box)

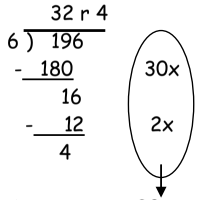
Y5

Children will continue to use written methods to solve short division TU ÷ U.

Children can start to subtract larger multiples of the divisor, e.g. 30x

Short division HTU ÷ U

196 ÷ 6



Answer : 32 remainder 4 or 32 r 4

Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

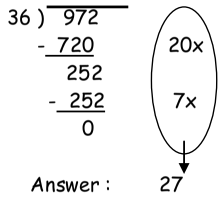
Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example 240 ÷ 52 is 4 remainder 32, but whether the answer should be rounded up to 5 or rounded down to 4 depends on the context.

Y6

Children will continue to use written methods to solve short division TU ÷ U and HTU ÷ U.

Long division HTU ÷ TU

972 ÷ 36

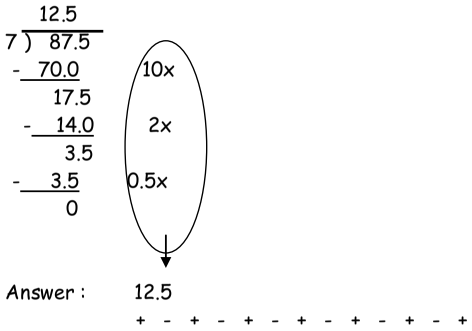


Answer : 27

Any remainders should be shown as fractions, i.e. if the children were dividing 32 by 10, the answer should be shown as $3\ ^{2}/_{10}$ which could then be written as $3\ ^{1}/_{5}$ in it's lowest terms.

Extend to decimals with up to two decimal places. Children should know that decimal points line up under each other.

87.5 ÷ 7



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

Children should not be made to go onto the next stage if:

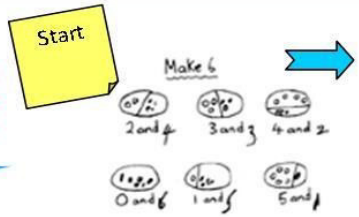
7) **they are not ready.**
8) **they are not confident.**

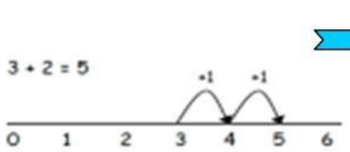
Children should be encouraged to approximate their answers before calculating.
Children should be encouraged to check their answers after calculation using an appropriate strategy.
Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

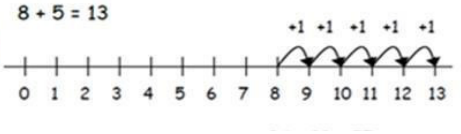
S. Greenaway, Maths Leader
December 2013

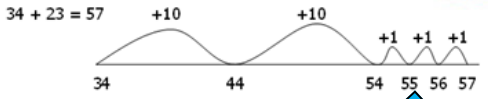
ADDITION

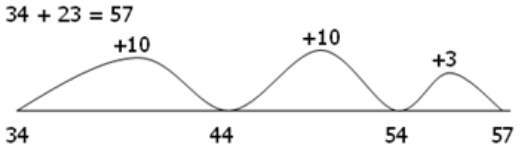
Progression Through Calculation Mat

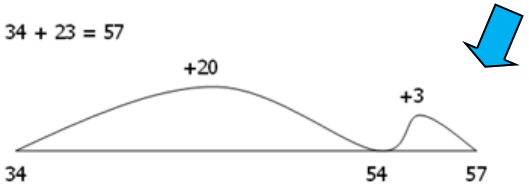


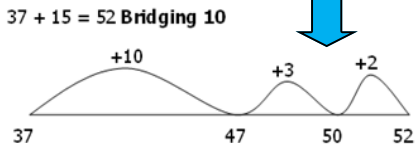


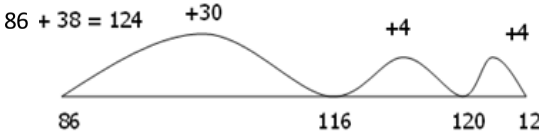


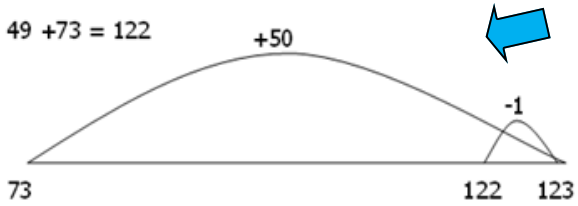


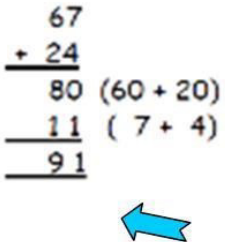


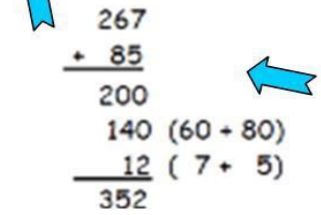


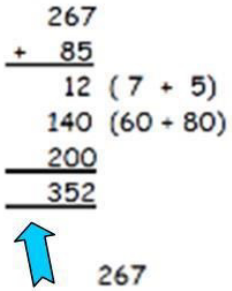


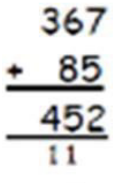


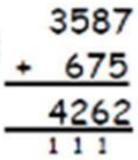










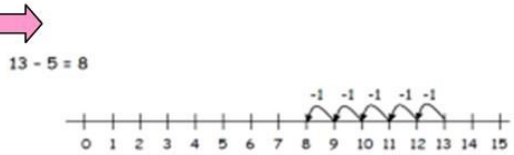


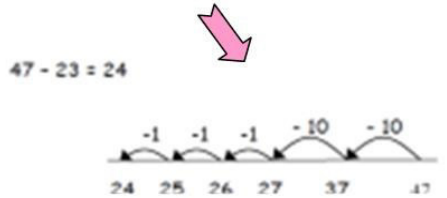
SUBTRACTION

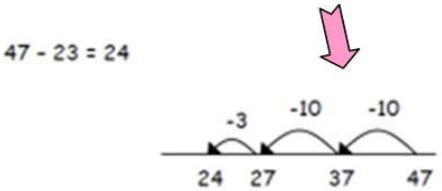
Progression Through Calculation Mat

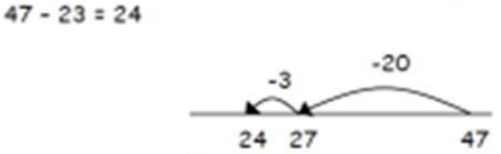
Start

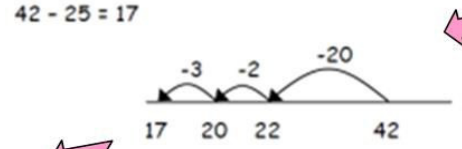
Use pictures...

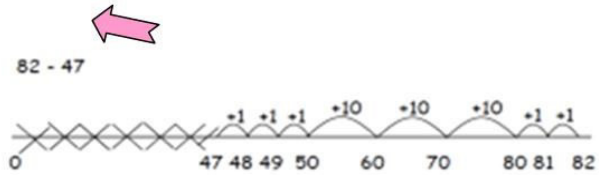












$$\begin{array}{rrcl} & 89 & = & 80 + 9 \\ - & 57 & & 50 + 7 \\ \hline & & & 30 + 2 = 32 \end{array}$$

$$\begin{array}{rl} & {}^{60}\cancel{70} + {}^{1}1 \\ - & 40 + 6 \\ \hline & 20 + 5 = 25 \end{array}$$

$$\begin{array}{rl} & {}^{600}\cancel{700} + {}^{140}\cancel{50} + {}^{1}4 \\ - & \qquad 80 + 6 \\ \hline & 600 + 60 + 8 = 668 \end{array}$$

$$\begin{array}{rl} & {}^{6\,14\,1}\cancel{7}\cancel{8}4 \\ - & 86 \\ \hline & 668 \end{array}$$

Unless the numbers are close together or near to multiples of 10,100 etc, then a number line should be used to count on.

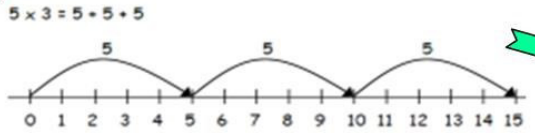
MULTIPLICATION

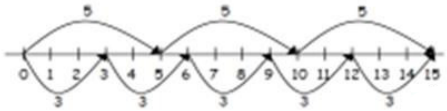
X

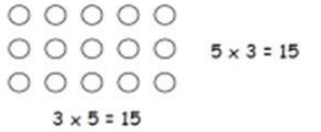
Progression Through Calculation Mat

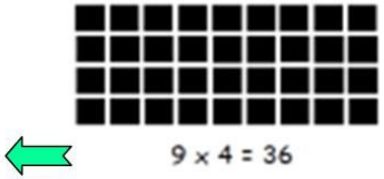
Start

Use pictures...

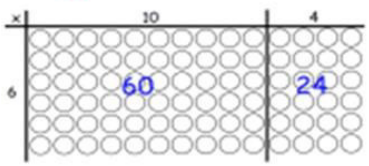








38 x 5 = (30 x 5) + (8 x 5)
= 150 + 40
= 190



x	20	3	160
8	160	24	+ 24
			184

x	300	40	6	2700
9	2700	360	54	+ 360
				+ 54
				3114

x	70	2	2100
30	2100	60	+ 560
8	560	16	+ 60
			+ 16
			2736

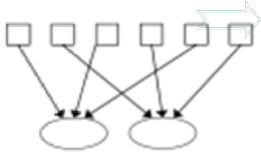
4	0.9	0.02	12
12	2.7	0.06	+ 0.7
			+ 0.06
			12.76

DIVISION

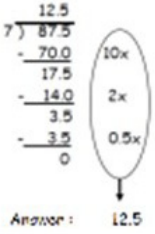
Progression Through

Start

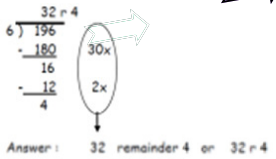
Use pictures...



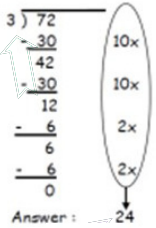
87.5 ÷ 7



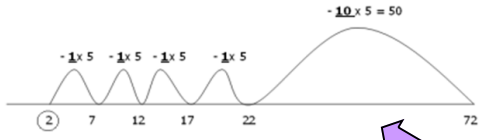
196 ÷ 6



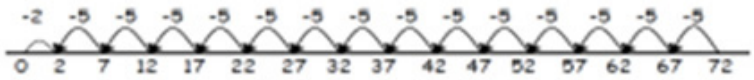
72 ÷ 3



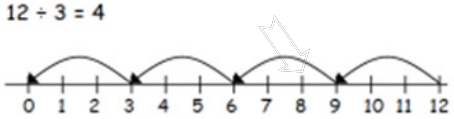
72 ÷ 5 = 14 r 2



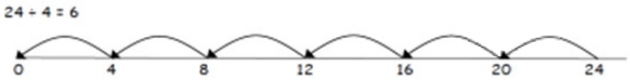
72 ÷ 5



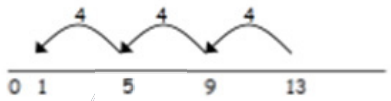
12 ÷ 3 = 4



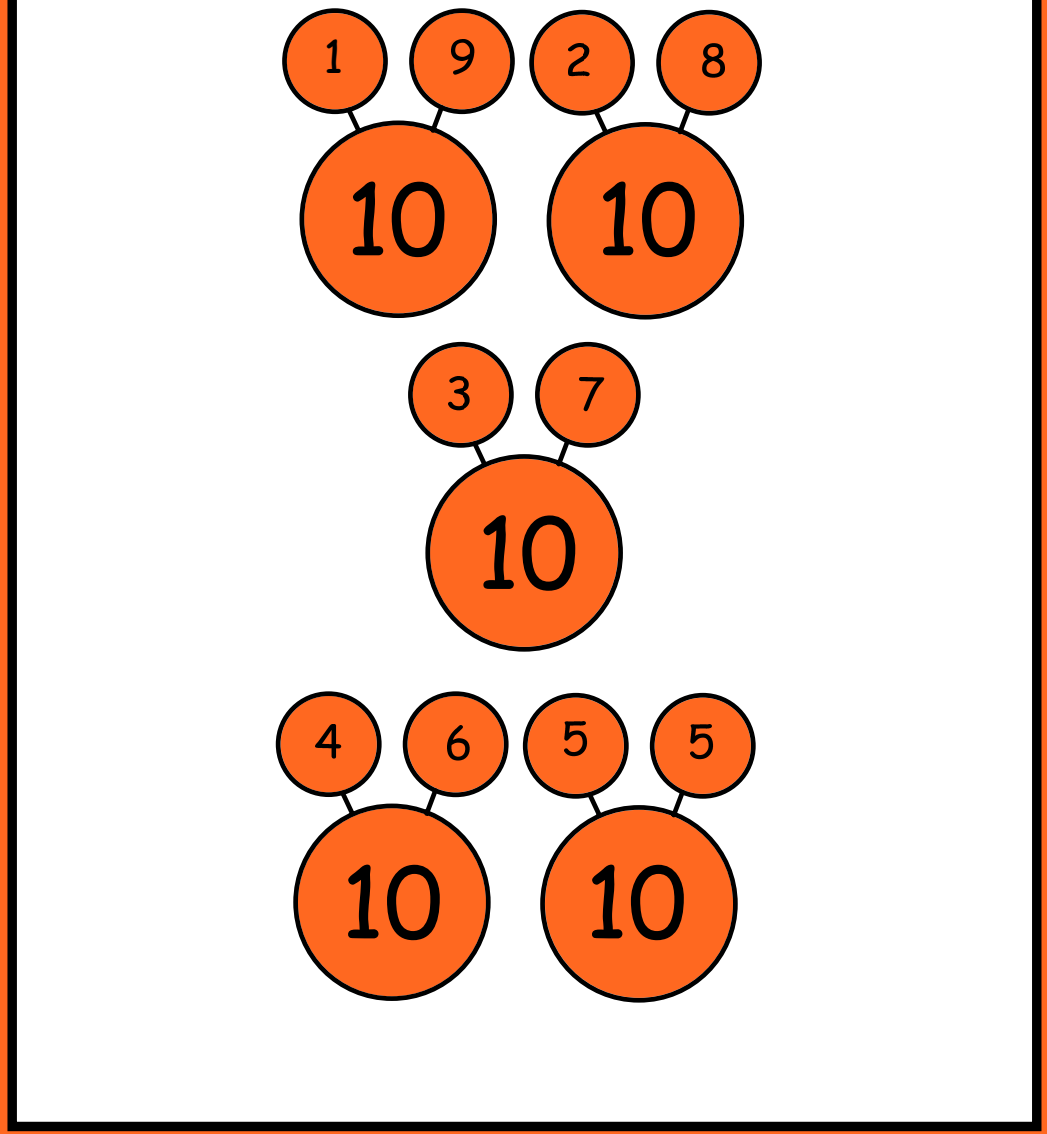
24 ÷ 4 = 6



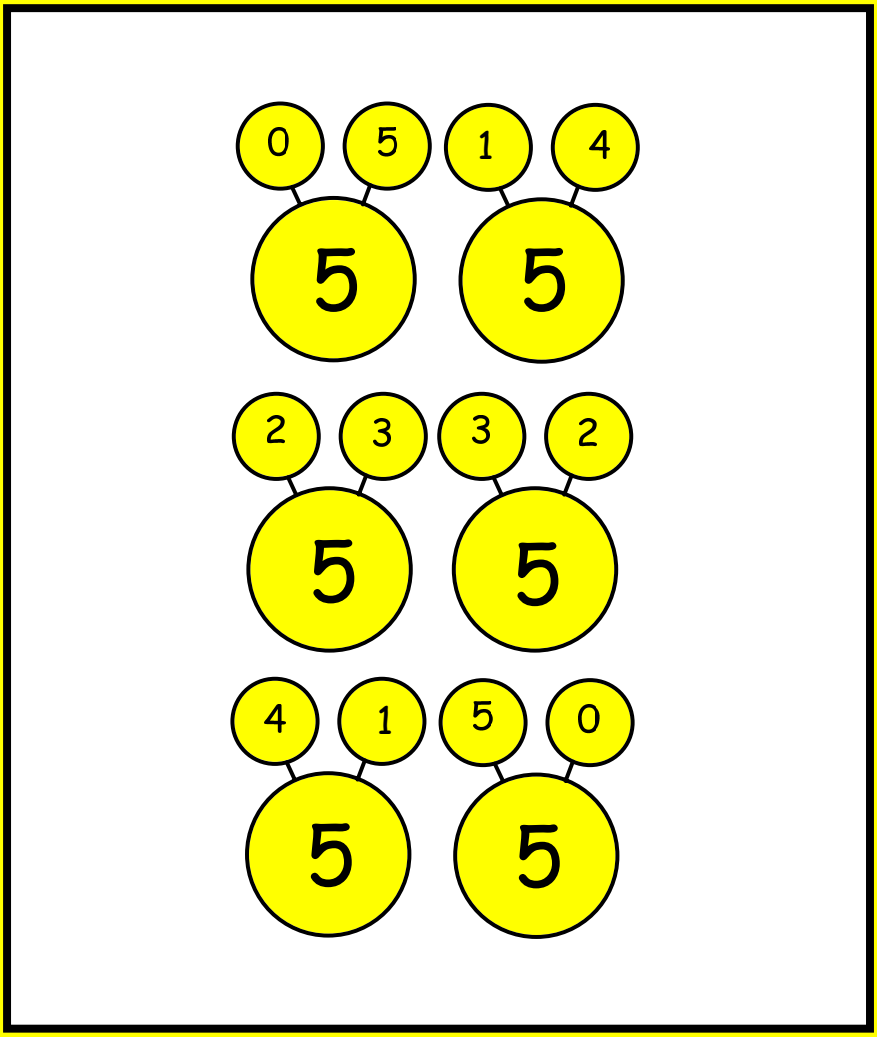
13 ÷ 4 = 3 r 1



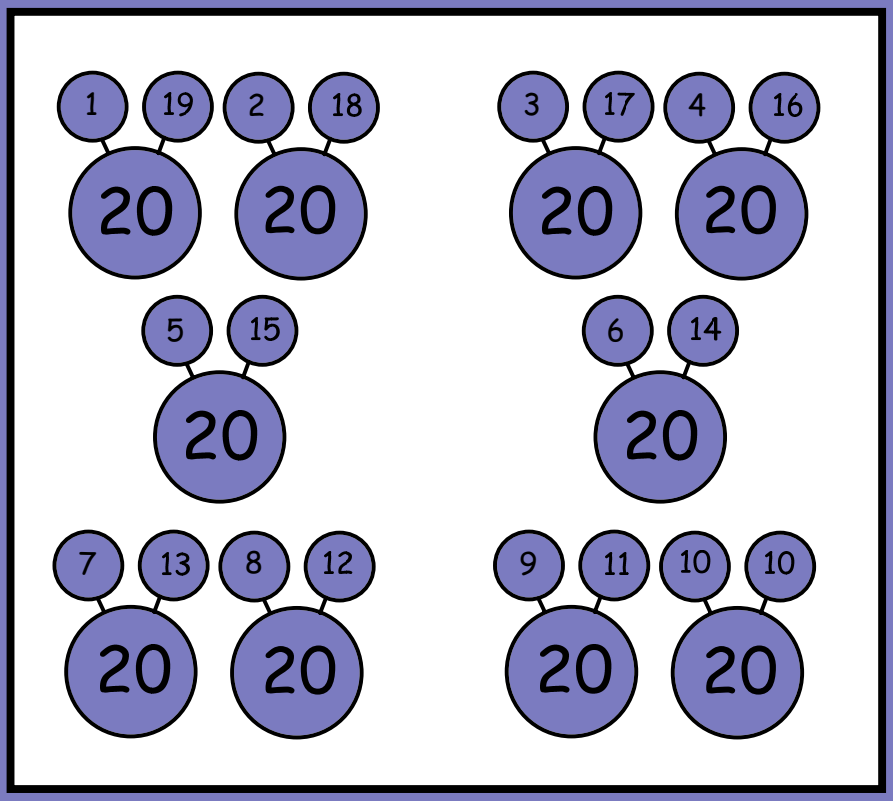
Number bonds to 10



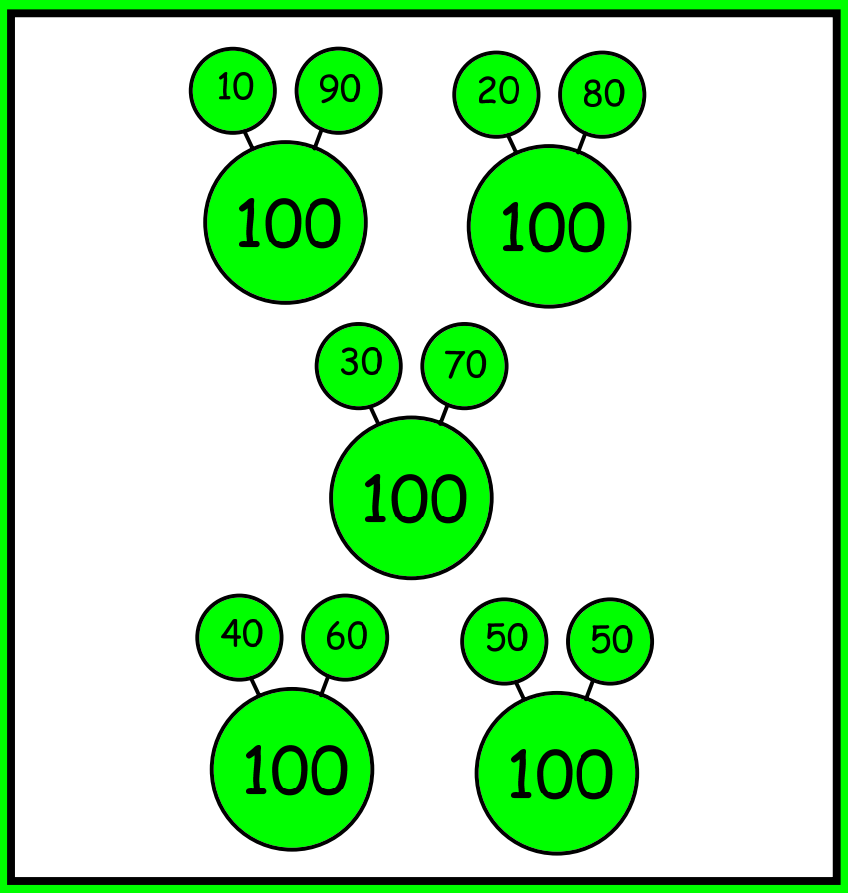
Number bonds to 5



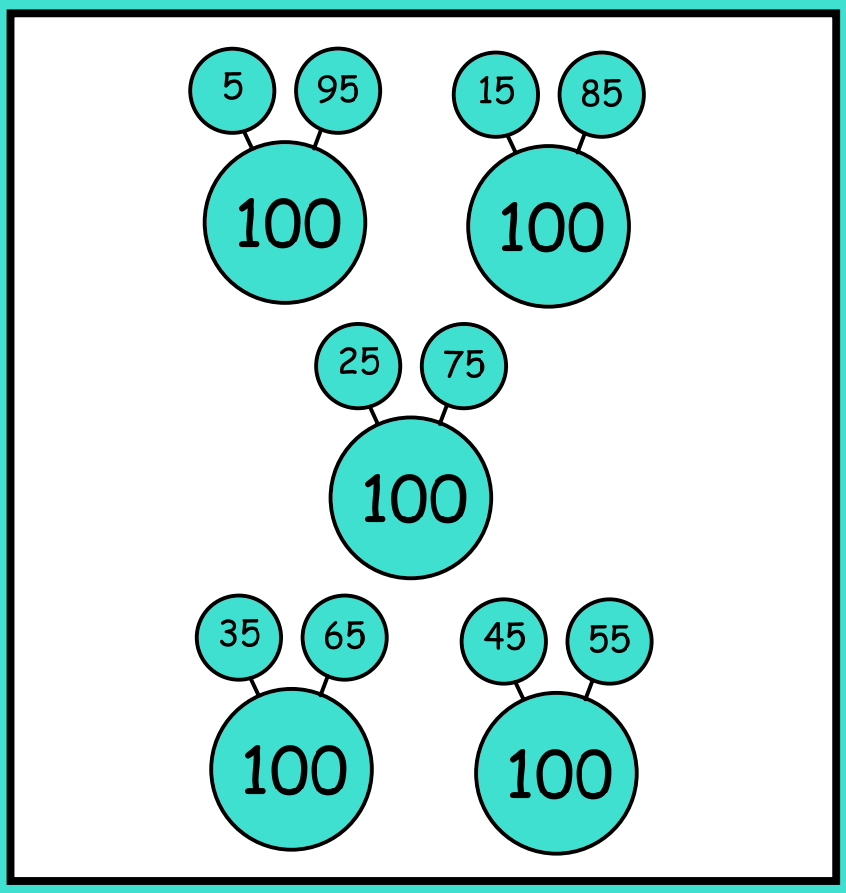
Number bonds to 20



Number bonds to 100



Number bonds to 100 using 5s



Times tables

2

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

2

1 x 2 = 2	7 x 2 = 14
2 x 2 = 4	8 x 2 = 16
3 x 2 = 6	9 x 2 = 18
4 x 2 = 8	10 x 2 = 20
5 x 2 = 10	11 x 2 = 22
6 x 2 = 12	12 x 2 = 24

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Times tables

10

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

10

1 x 10 = 10

2 x 10 = 20

3 x 10 = 30

4 x 10 = 40

5 x 10 = 50

6 x 10 = 60

7 x 10 = 70

8 x 10 = 80

9 x 10 = 90

10 x 10 = 100

11 x 10 = 110

12 x 10 = 120

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Times tables

5

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

5

1 x 5 = 5

2 x 5 = 10

3 x 5 = 15

4 x 5 = 20

5 x 5 = 25

6 x 5 = 30

7 x 5 = 35

8 x 5 = 40

9 x 5 = 45

10 x 5 = 50

11 x 5 = 55

12 x 5 = 60

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Times tables

3

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

3

1 x 3 = 3	7 x 3 = 21
2 x 3 = 6	8 x 3 = 24
3 x 3 = 9	9 x 3 = 27
4 x 3 = 12	10 x 3 = 30
5 x 3 = 15	11 x 3 = 33
6 x 3 = 18	12 x 3 = 36

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Times tables

4

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

4

1 x 4 = 4

2 x 4 = 8

3 x 4 = 12

4 x 4 = 16

5 x 4 = 20

6 x 4 = 24

7 x 4 = 28

8 x 4 = 32

9 x 4 = 36

10 x 4 = 40

11 x 4 = 44

12 x 4 = 48

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Times tables

11

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

11

1 x 11 = 11	7 x 11 = 77
2 x 11 = 22	8 x 11 = 88
3 x 11 = 33	9 x 11 = 99
4 x 11 = 44	10 x 11 = 110
5 x 11 = 55	11 x 11 = 121
6 x 11 = 66	12 x 11 = 132

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Times tables

6

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

6

1 x 6 = 6

2 x 6 = 12

3 x 6 = 18

4 x 6 = 24

5 x 6 = 30

6 x 6 = 36

7 x 6 = 42

8 x 6 = 48

9 x 6 = 54

10 x 6 = 60

11 x 6 = 66

12 x 6 = 72

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Times tables

7

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

7

1 x 7 = 7

2 x 7 = 14

3 x 7 = 21

4 x 7 = 28

5 x 7 = 35

6 x 7 = 42

7 x 7 = 49

8 x 7 = 56

9 x 7 = 63

10 x 7 = 70

11 x 7 = 77

12 x 7 = 84

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Times tables

8

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

8

1 x 8 = 8	7 x 8 = 56
2 x 8 = 16	8 x 8 = 64
3 x 8 = 24	9 x 8 = 72
4 x 8 = 32	10 x 8 = 80
5 x 8 = 40	11 x 8 = 88
6 x 8 = 48	12 x 8 = 96

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Times tables

9

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

9

1 x 9 = 9

2 x 9 = 18

3 x 9 = 27

4 x 9 = 36

5 x 9 = 45

6 x 9 = 54

7 x 9 = 63

8 x 9 = 72

9 x 9 = 81

10 x 9 = 90

11 x 9 = 99

12 x 9 = 108

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Times tables

12

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

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Times tables

12

1 x 12 = 12	7 x 12 = 84
2 x 12 = 24	8 x 12 = 96
3 x 12 = 36	9 x 12 = 108
4 x 12 = 48	10 x 12 = 120
5 x 12 = 60	11 x 12 = 132
6 x 12 = 72	12 x 12 = 144

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2 Times Table Test

8	X	2	=
3	X	2	=
7	X	2	=
1	X	2	=
12	X	2	=
6	X	2	=
9	X	2	=
11	X	2	=
2	X	2	=
10	X	2	=
4	X	2	=
5	X	2	=

Must be carried out with a 2 minute sand timer.

3 Times Table Test

8	X	3	=
3	X	3	=
7	X	3	=
1	X	3	=
12	X	3	=
6	X	3	=
9	X	3	=
11	X	3	=
2	X	3	=
10	X	3	=
4	X	3	=
5	X	3	=

Must be carried out with a 2 minute sand timer.

4 Times Table Test

8	X	4	=
3	X	4	=
7	X	4	=
1	X	4	=
12	X	4	=
6	X	4	=
9	X	4	=
11	X	4	=
2	X	4	=
10	X	4	=
4	X	4	=
5	X	4	=

Must be carried out with a 2 minute sand timer.

5 Times Table Test

8	X	5	=
3	X	5	=
7	X	5	=
1	X	5	=
12	X	5	=
6	X	5	=
9	X	5	=
11	X	5	=
2	X	5	=
10	X	5	=
4	X	5	=
5	X	5	=

Must be carried out with a 2 minute sand timer.

6 Times Table Test

8	X	6	=
3	X	6	=
7	X	6	=
1	X	6	=
12	X	6	=
6	X	6	=
9	X	6	=
11	X	6	=
2	X	6	=
10	X	6	=
4	X	6	=
5	X	6	=

Must be carried out with a 2 minute sand timer.

7 Times Table Test

8	X	7	=
3	X	7	=
7	X	7	=
1	X	7	=
12	X	7	=
6	X	7	=
9	X	7	=
11	X	7	=
2	X	7	=
10	X	7	=
4	X	7	=
5	X	7	=

Must be carried out with a 2 minute sand timer.

8 Times Table Test

8	X	8	=
3	X	8	=
7	X	8	=
1	X	8	=
12	X	8	=
6	X	8	=
9	X	8	=
11	X	8	=
2	X	8	=
10	X	8	=
4	X	8	=
5	X	8	=

Must be carried out with a 2 minute sand timer.

9 Times Table Test

8	X	9	=
3	X	9	=
7	X	9	=
1	X	9	=
12	X	9	=
6	X	9	=
9	X	9	=
11	X	9	=
2	X	9	=
10	X	9	=
4	X	9	=
5	X	9	=

Must be carried out with a 2 minute sand timer.

10 Times Table Test

8	X	10	=
3	X	10	=
7	X	10	=
1	X	10	=
12	X	10	=
6	X	10	=
9	X	10	=
11	X	10	=
2	X	10	=
10	X	10	=
4	X	10	=
5	X	10	=

Must be carried out with a 2 minute sand timer.

11 Times Table Test

8	X	11	=
3	X	11	=
7	X	11	=
1	X	11	=
12	X	11	=
6	X	11	=
9	X	11	=
11	X	11	=
2	X	11	=
10	X	11	=
4	X	11	=
5	X	11	=

Must be carried out with a 2 minute sand timer.

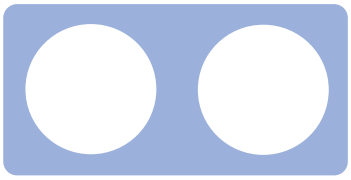
12 Times Table Test

8	X	12	=
3	X	12	=
7	X	12	=
1	X	12	=
12	X	12	=
6	X	12	=
9	X	12	=
11	X	12	=
2	X	12	=
10	X	12	=
4	X	12	=
5	X	12	=

Must be carried out with a 2 minute sand timer.

1

one



2

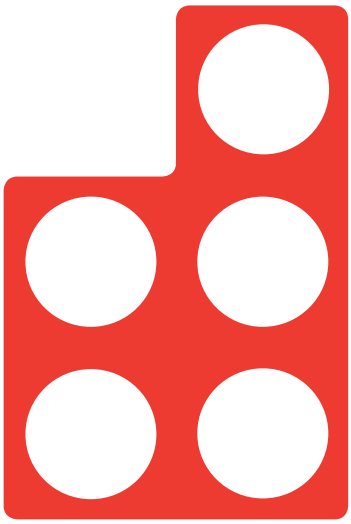
two

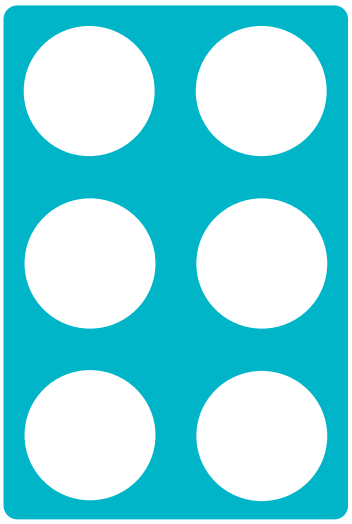
3

three

4

four





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five

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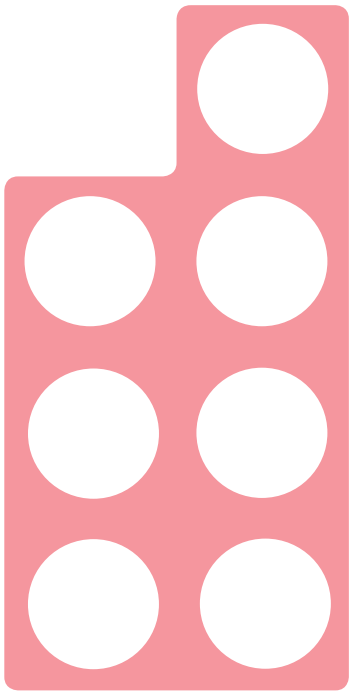
six



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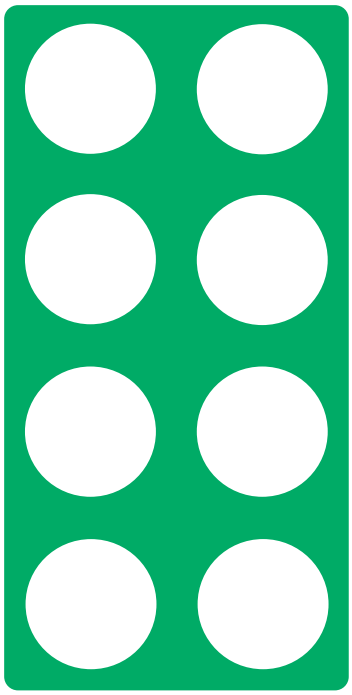
seven



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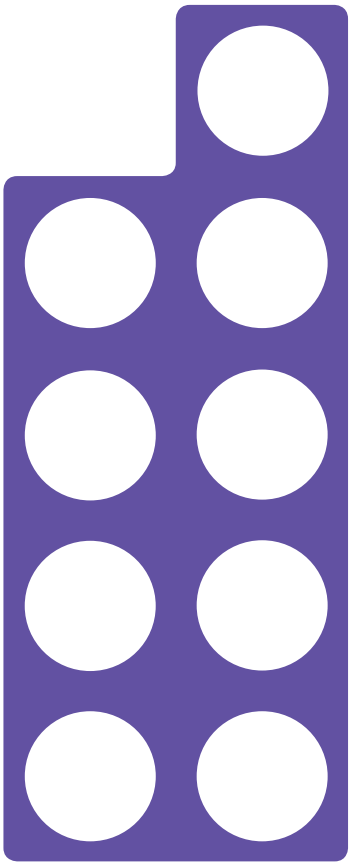
eight



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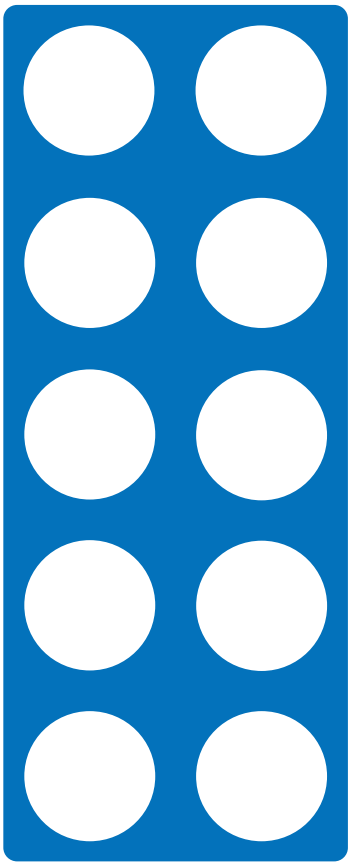
nine



10

ten

Aims

- To gain a greater understanding of some of the challenges inherent in maths
- To see how working with Numicon can help children and their teachers through the use of visual imagery and practical work
- To give teachers the knowledge and confidence to use Numicon within their everyday teaching
- To understand how the use of ongoing assessment using Numicon can help to remove gaps in children's mathematical understanding

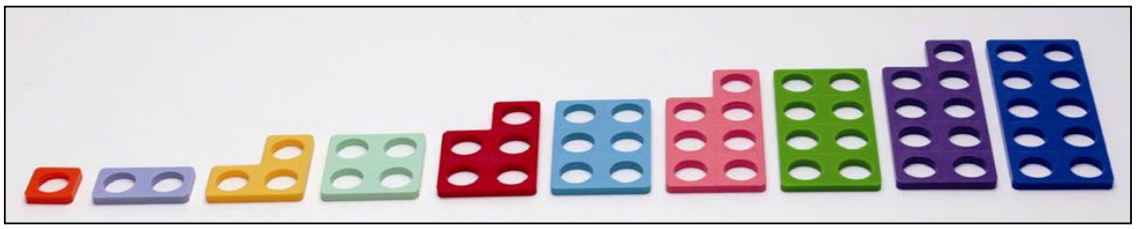
Key factors influencing mathematics learning

- Ability to sequence
- Working memory/auditory, visual
- Processing
- Language skills
- Motor skills
- Attitude – is maths seen as relevant?
- Teaching approach

Some challenges in mathematics

- Maths uses familiar words in an unfamiliar context
- Numbers are abstract ideas… all we can show children are number representations
- Numerals are arbitrary symbols… 1 2 3 4 5 6 7 8 9 10

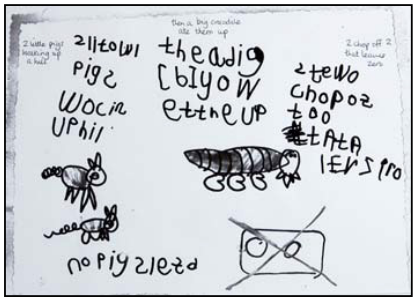
Numicon provides structured number representations



Seeing a pattern is at the heart of mathematical thinking

Effective teachers of numeracy help children to make connections

Numicon structured imagery can help children to connect their different mathematical experiences both within maths itself and between everyday mathematical experiences and classroom learning.



Rationale for using Numicon

- Quality first learning
- Inclusive
- Progressive
- Children can understand number relationships
- Children do calculating without counting
- Children learn mathematical language
- Children learn to make connections to use and apply their understanding

Numicon is a progressive teaching programme

All activities focus on language with action and also on making connections to establish a fundamental understanding of number.

All Numicon Kits cover these 3 areas:

Firm Foundations Kit – EYFS
Closing the Gap – NC P level 4 to NC level 1c
Kit 1 – progression through KS1 Primary Maths Strategy
Kit 2 – progression through KS1 Primary Maths Strategy
Investigations with Numicon - mathematical challenges for KS2

The Numicon website has links to show EYFS and P levels and the strategy objectives for each of the Numicon activities.

Exploring and making connections

Numicon provides a structure for children to explore and make connections within a number rich environment. The teaching guides give examples of lots of practical experiences with Numicon in sand, water, dough, and so on. The activity cards in **Firm Foundations** have activities which help children to make these vital connections.

Importance of mathematical language

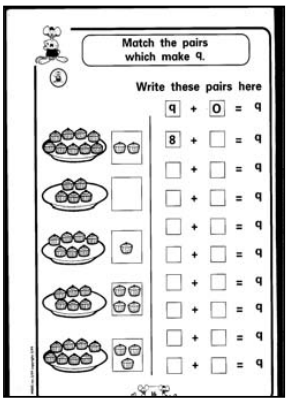
The development of children's language is ongoing throughout all activities because mathematical language and the way it is used e.g. familiar words used in an unfamiliar context, switching between using numbers as adjectives and nouns, can present children with problems. Language is signalled on each Activity card.

Firm Foundations for all learners in the Early Years

- Ordering Numicon Shapes, giving them number names and attaching numerals
- Grouping objects into Numicon patterns without counting
- Combining Numicon in addition
- Comparing Numicon Shapes in subtraction
- Confidently using the language of addition and subtraction

In Key Stage 1, Kit 1 and Kit 2 provide the foundation for all later work in KS2

- Introducing symbols for arithmetic notation and mental arithmetic strategies
- Place value
- Equivalence
- Addition and Subtraction with numbers to 100
- Multiplication & Division
- Beginning fractions



Counting experience forms an essential **part** of children's developing understanding of numbers, but it is by no means the best foundation for their calculating.

What is calculating?

- Calculating is used to answer 'how many?' questions without counting
- Adding is what we do instead of counting, multiplying is what we do instead of adding
- Beware! complex ideas can appear deceptively simple

2 + 1 = 3

Key ideas addressed in Kit 1 are often where the roots of difficulties lie for older children

- Remembering the count sequence
- Creating patterns and sequencing
- Recall of addition and subtraction facts of numbers up to 10 – reliance on counting as main strategy
- Equivalence
- Place value
- Understanding symbols

Addition

- Children can calculate using Numicon, without relying on counting
- Use Feely Bag, 2 sets of Numicon Shapes 1-10, Numeral cards 1-10

Equivalence

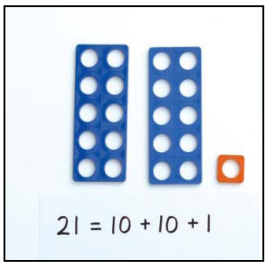
- Children learn that = means a balance – not just where to put the answer!
- Use Pan balance, 2 sets of Numeral Shapes 1-10, word cards

Subtraction

- Taught first as "take away"
- Children learn to use the action for the sign before needing to write the symbol
- Use 1 set of Numicon Shapes 1-10, spi nners, dice and can also use subtraction covers

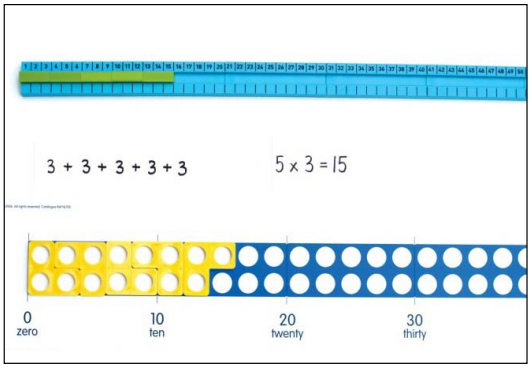
Place Value

- Numicon is useful for grouping and also for place value notation
- Practical - put Shapes in order 1-10, make 19 then put numeral cards underneath. Change to 15 – which digit changes as the Shape changes? Then build 25 - which digit needs to change this time?
- Variety of number lines can be used to find the number each time
- Calculating without counting – wrapping paper practical
- Using number lines and tracks to show relationship between the 1-100 number line and 1-100 number square



Multiplication

- Introduced through language, action and sign
- Use Numicon Shapes and number rods to show commutative properties
- The word "product" or the idea of finding an answer is not discussed until children fully understand the action of finding "lots of"
- Division is introduced as the inverse of multiplication



Key Stage 2 - all work extends ideas already met in KS1

- Look at multiplication and division in Kit 2 for work on factors, primes, square numbers
- Place value – work with higher numbers
- Addition and subtraction working with higher numbers and towards written calculation

Investigations with Numicon

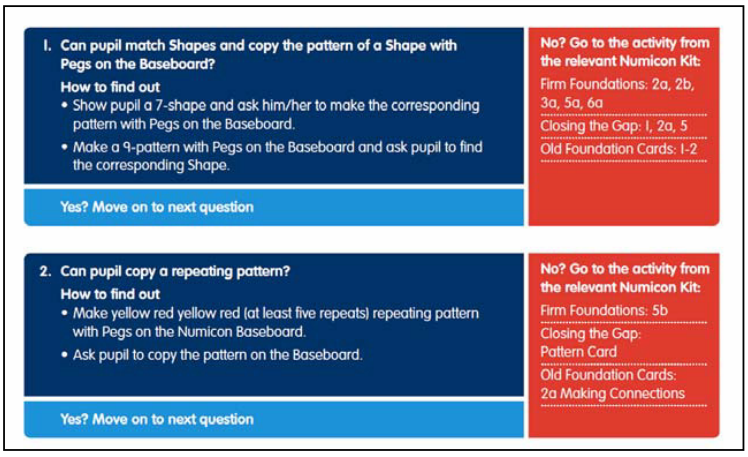
- Three in a bag - If I only have three shapes in the feely bag, what is the smallest number they could make? How about the largest? Can all totals between 3 and 30 be made with only three shapes?
- Sum and product - There are four numbers. Their sum is 10. Largest minus the smallest = 2. Product of the smallest times largest is odd. Is this set possible? Provide proof for your answer.

Who might be struggling in maths?

- Pupils having difficulty in acquiring mathematical competencies
- Pupils having difficulty in accessing mathematical teaching and learning
- Social, emotional and behavioural difficulties affecting pupil's approaches to learning
- Pupils who have missed periods of schooling, previous ineffective teaching, specific gaps in understanding, EAL

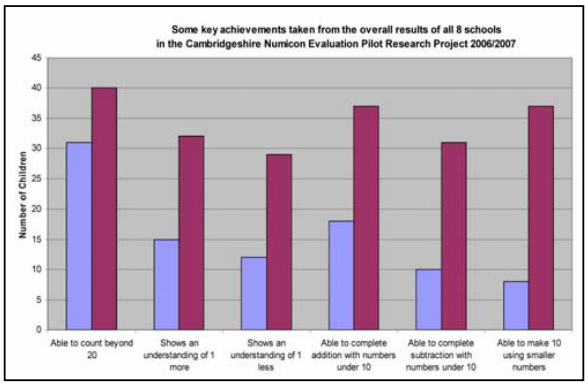
Assessing children's understanding

- Avoid labels
- Profile children using Assessment Signposts & Records of Progress
- Nothing has gone wrong when children find something difficult; it is a sign that they are learning something important
- Children need support and encouragement while they find something difficult, not immediate flight into something else that is easy



For Numicon to make a real difference to children's mathematical development, it needs to be part of the bank of resources available on a daily basis – not just something that comes out of the cupboard on special occasions or for those who are struggling.

Numicon is most successful where children use it not only in intervention strategies but when everyone uses it within whole class lessons.



In this multi-sensory approach we see raised achievement and a striking *confidence* in children's knowledge, skills and understanding!

Changes to the Maths Curriculum: Year 1

At a glance

How does the new curriculum compare to the primary framework for Mathematics (2006)?

What's gone?	What's been added?
• Data handling/Statistics is removed from Y1 • No specific requirement to describe patterns • No specific requirements to describe ways of solving problems or explain choices	• Counting & writing numerals to 100 • Write numbers in words up to 20 • Number bonds secured to 20 • Use of vocabulary such as equal, more than, less than, fewer, etc.

In detail

A direct reference to the former objectives of the primary framework. Where an objective was covered in more than one block, it is only recorded once.

Red indicates no longer required in Y1; green content is new to Year 1

Use and apply mathematics	
Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money; recognise the value of coins	"solve one-step problems that involve addition & subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = [] – 9" "recognise and know the value of different denominations of coins and notes"
Describe a problem using numbers, practical materials and diagrams; use these to solve the problem and set the solution back in the original context	See above
Answer a question by selecting and using suitable equipment, and sorting information, shapes or objects; display results using tables and pictures	See above
Describe simple patterns and relationships involving numbers or shapes; decide whether examples satisfy given conditions	Not explicitly required in new Programme of Study
Describe ways of solving problems and explain choices and decisions orally or using pictures	

Counting & Number Relationships	
Count reliably at least 20 objects recognising that when rearranged the number of objects stays the same; relate addition to counting on and count on or back in ones, twos, fives and tens; estimate a number of objects that can be checked by counting	**Extended to counting to 100** Similar
Compare and order numbers, using the related vocabulary; use the equals (=) sign	Use **+ -** and =
Read and write numerals from 0 to 20, then beyond; use knowledge of place value to position these numbers on a number track and number line	**Extended to numerals to 100; words to 20**
Say the number that is one more or less than any given number, and ten more or less for multiples of ten	Similar **use the language of: equal to, more than, less than (fewer), most, least**
Use the vocabulary of halves and quarters in context	"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."

Number Facts	
Derive and recall all pairs of numbers with a total of 10 and addition facts for totals to at least 5; work out the corresponding subtraction facts	**"represent and use number bonds and related subtraction facts within 20"**
Use knowledge of counting in twos, fives and tens to derive the multiples of 2, 5 and 10 to the tenth multiple	count in multiples of twos, fives and tens
Recall the doubles of all numbers to at least 10	"represent and use number bonds and related subtraction facts within 20"

Calculations	
Recognise that addition can be done in any order and use this to add mentally a one-digit number or a multiple of 10 to a one-digit or two-digit number	"add and subtract one-digit and two-digit numbers to 20, including zero"
Subtract one-digit numbers from one-digit and two-digit numbers and a multiple of 10 from a two-digit number; apply addition and subtraction strategies, e.g. counting on to find the difference	"add and subtract one-digit and two-digit numbers to 20, including zero"
Understand subtraction as both 'taking away' and 'difference' and use the related vocabulary and symbols to describe and record addition and subtraction number sentences	"read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs"
Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups	" solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher."

Position & Transformation	
Visualise and name common 2-D shapes and 3-D solids and describe their features; use them to make patterns	"recognise and name common 2-D and 3-D shapes"
Identify objects that rotate; recognise and make whole	"describe position, directions and movements, including half, quarter and three-quarter turn"
Visualise and describe the position of objects and direction and distance when moving them	

Measure	
Estimate, measure, weigh and compare objects, choosing and using suitable uniform non-standard or standard units and measuring instruments, e.g. a lever balance, metre stick or measuring jug	Compare, describe, measure and begin to record and solve practical problems for length/height/capacity/time
Use vocabulary related to time; order days of the week and months; read the time to the hour and half hour	"recognise and use language relating to dates, including days of the week, weeks, months and years" "tell the time to the hour and half past the hour and draw the hands on a clock face to show these times."

Data handling	
Answer a question by recording information in lists and tables; present outcomes using practical resources, pictures, block graphs or pictograms	No statistics work is included in the Year 1 programme of study
Use diagrams to sort objects into groups according to a given criterion; suggest a different criterion for grouping the same objects	

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Changes to the Maths Curriculum: Year 2

At a glance

How does the new curriculum compare to the primary framework for Mathematics (2006)?

What's gone?	What's been added?
• Rounding two-digit numbers to the nearest 10 • Halving/doubling no longer explicitly required • Using lists/tables/diagrams to sort objects	• Solving problems with subtraction • Finding/writing fractions of quantities (and lengths) • Adding two 2-digit numbers • Adding three 1-digit numbers • Demonstrating commutativity of addition & multiplication • Describing properties of shape (e.g. edges, vertices) • Measuring temperature in °C • Tell time to nearest 5 minutes • Make comparisons using < > = symbols • Recognise £ p symbols and solve simple money problems*

*Was required in 2000 Programme of Study for KS1

In detail

A direct reference to the former objectives of the primary framework. Where an objective was covered in more than one block, it is only recorded once.

Red indicates no longer required in Y2; purple content has been moved to Y1; green content is new to Year 2

Use and apply mathematics	
Solve problems involving addition	Solve problems with addition & subtraction
Identify and record the number sentences involved in a problem	Moved to Y1
Follow a line of enquiry and answer questions by selecting and using suitable equipment and information and organising and presenting the information in lists	
Describe patterns and relationships involving numbers or shapes	"order and arrange combinations of mathematical objects in patterns"
Present solutions to problems in an organised way; explain decisions	

Counting & Number Relationships	
Read and write two- and three-digit numbers in figures and words; describe and extend number sequences and recognise odd and even numbers	"read and write numbers to at least 100 in numerals and in words" "recognising odd and even numbers"
Count up to 100 objects by grouping them and counting in tens, fives or twos; explain what each digit in a two-digit number represents, including numbers where 0 is a place holder; partition two-digit numbers in different ways, including into multiples of ten and one	"count in steps of 2, 3, and 5 from 0" "recognise the place value of each digit in a two-digit number" "use place value and number facts to solve problems."
Order two-digit numbers and position them on a number line; use the greater than (>), less than (<) signs	compare and order numbers from 0 up to 100; use <, > and = signs
Estimate a number of objects and round two-digit numbers to the nearest 10	Not explicitly mentioned
Find one half, one quarter and three quarters of shapes and sets of objects	recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity
	Adds "write simple fractions e.g. 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2."

Number Facts	
Derive and recall all addition and subtraction facts for each number to at least 10, all pairs with totals to 20 and all pairs of multiples of 10 with totals up to 100	**Moves to Y1** "recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100"
Understand that halving is the inverse of doubling and derive and recall doubles of all numbers to 20, and the corresponding halves	Not explicitly mentioned
Derive and recall multiplication facts for the 2, 5 and 10 times-tables and the related division facts; recognise multiples of 2, 5 and 10	" recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables"
Use knowledge of number facts and operations to check answers to calculations	"use…number facts to solve problems"

Calculations	
Add or subtract mentally a single-digit number or a multiple of 10 to or from any two-digit number; use practical and informal written methods to support addition and subtraction of two-digit numbers	add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit numbers
Understand that subtraction reverses addition and vice versa and use this to derive and record related addition and subtraction number sentences	"recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems."
Represent repeated addition and arrays as multiplication, and sharing and repeated subtraction (grouping) as division; use practical and informal written methods and related vocabulary to support multiplication and division calculations, including those with remainders	"solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts."
Use the symbols +, –, ×, ÷ and = to record and interpret number sentences involving all four operations; calculate the value of an unknown in a number sentence, e.g. 30 – ≤ = 24, ≤ ÷ 2 = 6	"calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs"
	Adds "show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot"; and "show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot"

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Position & Transformation	
Relate 2-D shapes and 3-D solids to drawings of them, and describe, classify, draw and make the shapes	Becomes "*draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them*"
Draw and complete shapes with reflective symmetry and draw the reflection of a shape in a mirror line along one side	Moves to Year 4
Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid	Moves to Year 4
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 two right angles can form a straight line	Becomes more detailed "*identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle*"
	Adds "*identify horizontal and vertical lines and pairs of perpendicular and parallel lines*"

Measure	
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	Moves to Year 4 Moves to Year 2
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	Reading to nearest whole unit moves to Year 2 Students measure, compare, add & subtract using common metric measures
Read the time on a 12-hour digital clock and to the nearest five minutes on an analogue clock; calculate time intervals and find start or end times for a given time interval	Moves to year 2; Y3 must tell time to nearest minute and use specific vocab, inc. seconds, a.m., p.m., etc. Students must also use Roman numerals and 24-hour clock.
	Adds: "know the number of seconds in a minute and the number of days in each month, year and leap year"

Data handling	
Answer a question by organising, representing and interpreting data; use tally charts, frequency tables, pictograms and bar charts to highlight results and observations; use ICT to create a simple bar chart	Becomes narrower: "*solve one-step and two-step using information presented in scaled bar charts and pictograms and tables*"
Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion	No longer explicit in Programme of Study

Changes to the Maths Curriculum: Year 3

At a glance

How does the new curriculum compare to the primary framework for Mathematics (2006)?

What's gone?	What's been added?
• Specific detail of problem-solving strategies (although the requirement to solve problems remains) • Rounding to nearest 10/100 moves to Year 4 • Reflective symmetry moves to Year 4 • Converting between metric units moves to Year 4 • No requirement to use Carroll/Venn diagrams	• Adding tens or hundreds to 3-digit numbers • Formal written methods for addition/subtraction • 8 times tables replaces 6 times tables (!) • Counting in tenths • Comparing, ordering, adding & subtracting fractions with common denominators • Indentifying angles larger than/smaller than right angles • Indentify horizontal, vertical, parallel and perpendicular lines • Tell time to the nearest minute, including 24-hour clock and using Roman numerals • Know the number of seconds in a minute and the number of days in each month, year and leap year

In detail

A direct reference to the former objectives of the primary framework. Where an objective was covered in more than one block, it is only recorded once.

Red indicates no longer required in Y3; purple content has been moved to KS1; green content is new to Year 3

Use and apply mathematics	
Solve one- and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations	Becomes "*solve number problems and practical problems*"
Represent the information in a problem using numbers and images; use these to find a solution and present it in context, where appropriate using £.p notation or units of measure	No longer explicit in the Programme of Study Moved to Year 2
Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information	Becomes broader "*interpret and present data using bar charts,pictograms and tables*" Line of enquiry no longer required
Use patterns, properties of and relationships between numbers or shapes to identify similarities and differences, and to solve puzzles	No longer explicit in the Programme of Study
Describe and explain methods, choices and solutions to problems, orally and in writing, using pictures and diagrams	No longer explicit in the Programme of Study

Counting & Number Relationships	
Order whole numbers to at least 1000 and position them on a number line	Becomes "compare and order numbers up to 1000 " and "read and write numbers up to 1000 in numerals and in words" Becomes "count from 0 in multiples of 4, 8, 50 and 100" building on counting in multiples of 2, 3, 5 & 10 in KS1.
Partition three-digit numbers in different ways, including into multiples of one hundred, ten and one	Becomes "*recognise the place value of each digit in a three-digit number (hundreds, tens, ones)*"
Round two- or three-digit numbers to the nearest 10 or 100 and give estimates and approximations to their sums and differences	Moves to Year 4
Read and write proper fractions, e.g. 3/7, 9/10, interpreting the denominator as the parts of a whole and the numerator as the number of parts; identify fractions of shapes and use diagrams to compare fractions and establish equivalents	Children are expected to: •Understand and count in tenths •Recognise & find fractions of sets of objects •Recognise & use fractions •Show equivalent fractions using diagrams •Add & subtract fractions with common denominators •Compare & order unit fractions & those with common denominators

Number Facts	
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	Moves to Year 2
Derive and recall multiplication facts for the 2, 3, 4, 5, 6 and 10 times-tables and the corresponding division facts	2, 5 and 10 times-tables moved to Year 2 3, 4 and 8 required in Year 3
Use knowledge of number operations and corresponding inverses to check calculations	Becomes "*estimate the answer to a calculation and use inverse operations to check answers*"

Calculations	
Add or subtract mentally combinations of one-digit and two-digit numbers	Moves to Year 2 Adds "*add units, tens or hundreds to 3-digit numbers mentally*"
Develop and refine written methods to support, record or explain the addition and subtraction of two-digit and three-digit numbers	Becomes more explicit "*add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction*"
Multiply one- and two-digit numbers by 10 or 100, and describe the effect	Multiplying by 10 covered in Year 2; further scale left to upper KS2
Use practical and informal written methods to support multiplication and division of two-digit numbers (e.g. 13 × 3, 30 ÷ 4); round remainders up or down, depending on the context	Becomes "*write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods*"
Understand that division reverses multiplication and vice versa and use to derive and record related multiplication and division number sentences	Narrowed to "*write and calculate mathematical statements for multiplication and division using the multiplication tables that they know*"
Find unit fractions of numbers and quantities, e.g. 1/2, 1/3, 1/4 and 1/6 of 12 litres	Begins in Y2 as "*write simple fractions e.g. 1/2 of 6 = 3*"

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Position & Transformation	
Relate 2-D shapes and 3-D solids to drawings of them, and describe, classify, draw and make the shapes	Becomes "*draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them*"
Draw and complete shapes with reflective symmetry and draw the reflection of a shape in a mirror line along one side	Moves to Year 4
Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid	Moves to Year 4
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 two right angles can form a straight line	Becomes more detailed "*identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle*"
	Adds "*identify horizontal and vertical lines and pairs of perpendicular and parallel lines*"

Measure	
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	Moves to Year 4 Moves to Year 2
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	Reading to nearest whole unit moves to Year 2 Students measure, compare, add & subtract using common metric measures
Read the time on a 12-hour digital clock and to the nearest five minutes on an analogue clock; calculate time intervals and find start or end times for a given time interval	Moves to year 2; Y3 must tell time to nearest minute and use specific vocab, inc. seconds, a.m., p.m., etc. Students must also use Roman numerals and 24-hour clock.
	Adds: "know the number of seconds in a minute and the number of days in each month, year and leap year"

Data handling	
Answer a question by organising, representing and interpreting data; use tally charts, frequency tables, pictograms and bar charts to highlight results and observations; use ICT to create a simple bar chart	Becomes narrower: "*solve one-step and two-step using information presented in scaled bar charts and pictograms and tables*"
Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion	No longer explicit in Programme of Study

Changes to the Maths Curriculum: Year 4

At a glance

How does the new curriculum compare to the primary framework for Mathematics (2006)?

What's gone?	What's been added?
• Specific detail on lines of enquiry, representing problems and find strategies to solve problems and explaining methods (i.e. largely from old Ma1) • Using mixed numbers (moved to Y5) • Most ratio work moved to Y6 • Written division methods (moved to Y5) • All calculator skills removed from KS2 PoS • Measuring angles in degrees (moved to Y5)	•Solving problems with fractions and decimals to two decimal places •Rounding decimals to whole numbers •Roman numerals to 100 •Recognising equivalent fractions •Knowing equivalent decimals to common fractions •Dividing by 10 and 100 (incl. with decimal answers) •Using factor pairs •Translation of shapes •Finding perimeter/area of compound shapes •Solve time conversion problems

In detail

A direct reference to the former objectives of the primary framework. Where an objective was covered in more than one block, it is only recorded once.

Red indicates no longer required in Y4; purple content has moved to Y3; green content is new to Year 4

Use and apply mathematics	
Solve one- and two-step problems involving numbers, money or measures, including time; choose and carry out appropriate calculations, using calculator methods where appropriate	"*solve addition and subtraction two-step problems in contexts*" and "*solve problems involving multiplying and adding*" "*solve simple measure and money problems involving fractions and decimals to two decimal places*."
Represent a problem using number sentences and diagrams, use these to find a strategy to solve the problem and present the solution in the context of the problem	No longer explicitly in Programme of Study
Suggest a line of enquiry and the strategy needed to pursue it; collect, organise and interpret selected information to find answers	No longer explicitly in Programme of Study
Use knowledge of numbers and shapes to identify patterns, properties and relationships, and apply them to unfamiliar situations; investigate a statement involving numbers and test it with examples	No longer explicitly in Programme of Study
Report solutions to problems, explanations and reasoning orally and in writing	No longer explicitly in Programme of Study

Number Facts	
Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000	Largely moved to Y2
Identify the doubles of two-digit numbers; use to calculate doubles of multiples of 10 and 100 and derive the corresponding halves	Doubling is only mentioned in Y1; not otherwise recorded explicitly in Programme of Study
Derive and recall multiplication facts up to 10 × 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple	recall multiplication and division facts for multiplication tables up to 12 × 12
Use knowledge of rounding, number operations and inverses to check calculations	*"round any number to the nearest 10, 100 or 1000"* and "*use inverse operations to check answers to a calculation*"
Identify pairs of fractions that total 1	Adds "*Recognise and show families of common equivalent fractions*"; and "*Recognise/write decimal equivalent to ¼, ½, & ¾. "*

Counting & Number Relationships	
Use positive and negative numbers in context; position them on a number line and state inequalities using the symbols < and >, e.g. –3 > –5, –1 > +1	"*count backwards through zero to include negative numbers*" (< > Symbols are used from Y2)
Use decimal notation for tenths and hundredths, relating the notation to money and measurement; position one- and two-place decimals on a number line	"*compare numbers with the same number of decimal places up to two decimal places*"
Recognise the equivalence between decimal and fraction forms of tenths and hundredths	" *recognise and write decimal equivalents of any number of tenths or hundredths*"
Use fractions to identify subsets of a set of objects use diagrams to identify equivalent fractions, e.g. 6/8 and 3/4, or 70/100 and 7/10; interpret mixed numbers and position them on a number line, e.g. 31/2	Becomes more challenging "*solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number*" Moves to Year 5
Use the vocabulary of ratio and proportion to describe the relationship between two quantities, e.g. 2 to every 3, and between part and whole, e.g. 2 in every 5; estimate proportion, e.g. 'for every 1 red car there are about 4 silver cars', or 'I'm asleep for about 1/3 of the day'	Solve problems relating to "harder correspondence problems such as n objects are connected to m objects" Most ratio work moves to Year 6
	Adds "*round decimals with one decimal place to the nearest whole number*"; and "*read Roman numerals to 100*"; "*understand the introduction of zero*"

Calculations	
Add or subtract mentally pairs of two-digit whole numbers, e.g. 47 + 58, 91 – 35	Moves to Year 2+
Use the standard written methods for addition and subtraction of two-digit and three-digit whole numbers and calculations with £.p	Becomes "*add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate*" and "*use the distributive law to multiply two digit numbers by one digit*"
Multiply or divide numbers to 1000 by 10 and then 100 (whole number answers), understanding the effect; relate to scaling up or down	"*find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths*"
Develop and refine written methods for multiplying and dividing a two-digit number by a one-digit number, to include division with remainders, e.g. 15 × 9, 98 ÷ 6	"*multiply two-digit and three-digit numbers by a one-digit number using formal written layout*" Written methods for division move to Y5
Find fractions of numbers, quantities or shapes, e.g. 1/5 of 30 plums, 3/8 of a 6 by 4 rectangle	Moves to Year 3
Use a calculator to carry out one- 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	All calculator skills move to KS3 Programme of Study (guidance says some potential calculator use in upper KS2)
	Adds "*multiply & divide mentally, including multiplying by 0 and 1; dividing by 1; multiplying together three numbers*"; and " *recognise and use factor pairs and commutativity in mental calculations*"

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Position & Transformation	
Draw polygons and classify them by identifying their properties	"*compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes*"
Visualise 3-D objects from 2-D drawings and make nets of common solids	Not explicitly required in Programme of Study
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	Moves to Year 3 Required in KS2 Geography "*describe positions on a 2-D grid as coordinates in the first quadrant*"
Know that angles are measured in degrees and that one whole turn is 360º compare and order angles less than 180º	Moves to Year 5 "*identify acute and obtuse angles and compare and order angles up to two right angles by size*"
	Adds "*describe movements as translations*"; and "*plot points and draw sides to complete a given polygon*"

Measure	
Use standard metric units and their abbreviations when estimating, measuring and recording length, mass 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	Moves to Year 3 "*estimate, compare and calculate different measures, including money in pounds and pence*" "*convert between different units of measure (e.g. kilometre to metre; hour to minute)*"
Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit	Scale-reading begins in Y2; there are no further specific mentions
Draw rectangles and measure and calculate their perimeters, find the area of rectilinear shapes drawn on a square grid by counting squares	"*measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres*" and "*find the area of rectilinear shapes by counting squares*"
Read time to the nearest minute; use am, pm and 12-hour clock notation; calculate time intervals from clocks and timetables	Moves to Year 3 Adds "*read, write and convert time between analogue and digital 12 and 24-hour clocks*"; and "*solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days*"

Data handling	
Determine the data needed to answer a specific question; organise, present, analyse and interpret the data in tables, diagrams, tally charts, pictograms and bar charts, using ICT where appropriate	"interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs" No need for specific questions, presentation, etc.
Compare the impact of representations where scales have intervals of differing step size	No longer mentioned in Programme of Study

Changes to the Maths Curriculum: Year 5

At a glance

How does the new curriculum compare to the primary framework for Mathematics (2006)?

What's gone?	What's been added?
• Detail of problem-solving process and data handling cycle no longer required • Calculator skills moved to KS3 • Probability moves to KS3 Several elements are now expected to be covered in lower KS2, e.g. decimals/fractions knowledge, points in the first quadrant; parallel/perpendicular lines	• Understand & use decimals to 3dp • Solve problems using up to 3dp, and fractions • Write %ages as fractions; fractions as decimals • Use vocabulary of primes, prime factors, composite numbers, etc. • Know prime numbers to 20 • Understand square and cube numbers • Use standard multiplication & division methods for up to 4 digits • add and subtract fractions with the same denominator • multiply proper fractions and mixed numbers by whole numbers • deduce facts based on shape knowledge • distinguish regular and irregular polygons • calculate the mean average

In detail

A direct reference to the former objectives of the primary framework. Where an objective was covered in more than one block, it is only recorded once.

Red indicates no longer required in Y5; purple content has moved to lower KS24; green content is new to Year 5

Use and apply mathematics	
Solve one and two-step problems involving whole numbers and decimals and all four operations, choosing and using appropriate methods, including calculator use	"*solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why*"; and "*solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign*"; and "*solve problems involving number up to three decimal places*"; and "*solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25*"
Represent a problem by identifying and recording the calculations needed to solve it; find possible solutions and confirm them in the context of the problem	Not explicitly mentioned in Programme of Study
Plan and pursue an enquiry; present evidence by collecting, organising and interpreting information; suggest extensions to the enquiry	Not explicitly mentioned in Programme of Study
Explore patterns, properties and relationships and propose a general statement involving numbers or shapes; identify examples for which the statement is true or false	Not explicitly mentioned in Programme of Study
Explain reasoning using diagrams, graphs and text	Not explicitly mentioned in Programme of Study

Counting & Number Relationships	
Count from any given number in whole number steps and decimal number steps, extending beyond zero when counting backwards; relate the numbers to their position on a number line	"*count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000*"
Explain what each digit represents in whole numbers and numbers with up to two decimal places, and partition these numbers	Decimals to 2dp covered in Year 4; Year 5 adds "*recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents*"; and "*read, write, order and compare numbers with up to three decimal places*"
Use sequences to scale numbers up or down; solve problems involving proportions of quantities and measurements, e.g. decrease quantities in a recipe designed to feed six people	"*scaling by simple fractions and problems involving simple rates*"
Express a smaller whole number as a fraction of a larger one; find equivalent fractions, including equivalent improper fractions and mixed numbers; relate fractions to their decimal representations	Expected in lower KS2 " *recognise mixed numbers and improper fractions and convert from one form to the other*"; and "*identify, name and write equivalent fractions of a given fraction*" Becomes "*read and write decimal numbers as fractions (e.g. 0.71 = 71/100)*"
Understand percentage as the number of parts in every 100 and express tenths and hundredths as percentages	"*recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator hundred, and as a decimal fraction*"
	Adds: "*compare and order fractions whose denominators are all multiples of the same number*"; and "*know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers*"; and "*establish whether a number up to 100 is prime and recall prime numbers up to 19*"

Number Facts	
Use knowledge of place value and addition and subtraction of two-digit numbers to derive sums and differences, doubles and halves of decimals, e.g. 6.5 ± 2.7, halve 5.6, double 0.34	Moves to lower KS2
Recall quickly multiplication facts up to 10 × 10, use to multiply pairs of multiples of 10 and 100 and derive quickly corresponding division facts	Table knowledge expected by Y4 to 12x12 "*multiply and divide numbers mentally drawing upon known facts*"
Identify pairs of factors of two-digit whole numbers and find common multiples, e.g. for 6 and 9	"*identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers*."
Use knowledge of number facts, place value and rounding to estimate and to check calculations	"*use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy*"; and "*round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000*"; and "*round decimals with two decimal places to the nearest whole number and to one decimal place*"
`	Adds: " *recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})*"

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Calculations	
Multiply mentally TU × U; use mental methods in special cases, e.g. to subtract 1995 from 6007, to multiply 18 by 25	"*multiply and divide numbers mentally drawing upon known facts*"
Use the standard written methods for addition and subtraction of whole numbers and decimals with one or two places	Moves to Year 4
Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 or 1000	*"multiply and divide whole numbers and those involving decimals by 10, 100 and 1000"*
Use the standard written methods for multiplication and division calculations of HTU × U, U.t × U, TU × TU and HTU ÷ U	*"multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers"*; and *"divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context"*
Find fractions using division, e.g. 1/100 of 5 kg, and percentages of numbers and quantities, e.g. 10%, 5% and 15% of £80	Moves to lower KS2; Year 5 adds: *"add and subtract fractions with the same denominator and multiples of the same number"*; and "multiply proper fractions and mixed numbers by whole numbers"
Use a calculator to solve problems, including those involving decimals or fractions, e.g. to find 3/4 of 150 g; interpret the display correctly in the context of measurement	Calculator skills are all moved to KS3 Programme of Study
	Adds: "*solve problems involving multiplication and division where larger numbers are used by decomposing them into their factors*"

Position & Transformation	
Identify, visualise and describe properties of rectangles, triangles, regular polygons and 3-D solids; use knowledge of properties to draw 2-D shapes and identify and draw nets of 3-D shapes	"*identify 3-D shapes, including cubes and other cuboids, from 2-D representations*"
Read and plot co-ordinates in the first quadrant and recognise parallel and perpendicular lines in grids and shapes; use a set-square and ruler to draw perpendicular and parallel lines	Plotting points moves to Year 4 Parallel & Perpendicular lines moves to Year 3
Complete patterns with up to two lines of symmetry and draw the position of a shape after a reflection or translation	Translation moved to Year 4; Symmetry introduced in Y4; "*identify, describe and represent the position of a shape following a reflection or translation*"
Estimate, draw and measure acute and obtuse angles using an angle measurer or protractor to a suitable degree of accuracy; calculate angles in a straight line	"*know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles*"; "*draw given angles, and measure them in degrees (°)*" & "*identify* angles at a point on a straight line and ½ a turn (total 180°)"

Measure	
Read, use and record standard metric units to estimate and measure length, mass and capacity; convert larger to smaller units using decimals to one place, e.g. change 2.6 kg to 2600 g	"*convert between different units of metric measure*"; and "*estimate volume and capacity* "
Estimate measurements of length, mass and capacity to a required degree of accuracy, e.g. the nearest centimetre; interpret a reading that lies between two unnumbered divisions on a scale	"*estimate volume and capacity* " Not explicitly mentioned in Programme of Study
Draw and measure lines to the nearest millimetre; measure and calculate the perimeter of regular and irregular polygons; use the formula for the area of a rectangle to calculate its area	"*measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres*"; and " *calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes*" Adds: *"use the properties of rectangles to deduce related facts and find missing lengths and angles"*; and *"distinguish between regular and irregular polygons based on reasoning about equal sides and angles"*
Read timetables and time using 24-hour clock notation; use a calendar to calculate time intervals	24-hour clock used in lower KS2 "*complete, read and interpret information in tables, including timetables*" "solve problems involving converting between units of time"

Data handling	
Describe the occurrence of familiar events using the language of chance or likelihood	Probability moves to KS3 Programme of Study
Determine the data needed to answer a set of related questions; select and organise relevant data using frequency tables; construct pictograms and bar graphs, and line graphs that represent the frequencies of events and changes over time; use ICT to present and highlight features that lead to further questions	Narrows to "*solve comparison, sum and difference problems using information presented in a line graph*" (i.e. removes need for ICT, data process, selecting/organising data, etc.)
Find and interpret the mode of a set of data	Not explicitly mentioned in Programme of Study

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Changes to the Maths Curriculum: Year 6

At a glance

How does the new curriculum compare to the primary framework for Mathematics (2006)?

What's gone?	What's been added?
• Detail of problem-solving processes no longer explicit • Divisibility tests • Calculator skills move to KS3 PoS • Rotation moves to KS3 • Probability moves to KS3 • Median/Mode/Range no longer required	• Compare and ordering fractions greater than 1 • Long division • 4 operations with fractions • Calculate decimal equivalent of fractions • Understand & use order of operations • Plot points in all 4 quadrants • Convert between miles and kilometres • Name radius/diameter and know relationship • Use formulae for area/volume of shapes • Calculate area of triangles & parallelograms • Calculate volume of 3-d shapes • Use letters to represent unknowns (algebra) • Generate and describe linear sequences • Find solutions to unknowns in problems

In detail

A direct reference to the former objectives of the primary framework. Where an objective was covered in more than one block, it is only recorded once.

Red indicates no longer required in Y6; purple content has moved to Y5; green content is new to Year 6

Use and apply mathematics	
Solve multi-step problems, and problems involving fractions, decimals and percentages, choosing and using appropriate and efficient methods at each stage, including calculator use	*"solve problems involving addition, subtraction, multiplication and division"; "solve problems which require answers to be rounded to specified degrees of accuracy"; and "solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate"*
Represent a problem by identifying and recording the calculations needed to solve it, using symbols for unknown quantities where appropriate; set solutions in the original context and check their accuracy	*"solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why"* *"use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy."* *(See also algebra notes at foot of page)*
Suggest, plan and develop lines of enquiry; collect, organise and represent information, interpret results and review methods; identify and answer related questions	Not explicitly in Programme of Study
Recognise and use sequences, patterns and relationships involving numbers and shapes; suggest hypotheses and test them systematically	Not explicitly in Programme of Study
Explain reasoning and conclusions, using symbols where appropriate	Not explicitly in Programme of Study

Counting & Number Relationships	
Find the difference between a positive and a negative integer, or two negative integers, in context	"*use negative numbers in context, and calculate intervals across zero*'
Use decimal notation for tenths, hundredths and thousandths, partition and order numbers with up to three decimal places, and position them on the number line	Moves to Year 5
Round numbers, including those with up to three decimal places	Becomes "*round any whole number to a required degree of accuracy*" and "*solve problems which require answers to be rounded to specified degrees of accuracy*"

Use fractions, percentages and the vocabulary of ratio and proportion to describe the relationships between two quantities and solve problems, e.g. identify the quantities needed to make a fruit drink by mixing water and juice in a given ratio	**"***solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts*"
Express a larger whole number as a fraction of a smaller one; simplify fractions; order a set of fractions by converting them to fractions with a common denominator	Expected lower in KS2 "*use common factors to simplify fractions; use common multiples to express fractions in the same denomination*"
Express one quantity as a percentage of another, e.g. express £400 as a percentage of £1000; find equivalent percentages, decimals and fractions	*"solve problems involving the calculation of percentages (e.g. of measures) such as 15% of 360 and the use of percentages for comparison"*
	Adds: "compare and order fractions, including fractions >1"

Number Facts	
Use knowledge of place value and multiplication facts to 10 × 10 to derive related multiplication and division facts involving decimal numbers, e.g. 0.8 × 7, 4.8 ÷ 6	**"***multiply one-digit numbers with up to two decimal places by whole numbers*"
Use knowledge of multiplication facts to derive quickly squares of numbers to 12 × 12 the corresponding squares of multiples of 10	Expected from lower KS2 Not explicitly mentioned in Programme of Study
Recognise that prime numbers have only two factors and identify prime numbers less than 100; find the prime factors of two-digit whole numbers	Moves to Year 5 *"identify common factors, common multiples and prime numbers"*
Use approximations and apply tests of divisibility to check results	Not explicitly mentioned in Programme of Study

Calculations	
Calculate mentally with whole numbers and decimals, e.g. U.t ± U.t, TU × U, U.t × U, TU ÷ U, U.t ÷ U	*"perform mental calculations, including with mixed operations and large numbers"*
Consolidate the use of standard written methods to add, subtract, multiply and divide integers and decimal numbers; calculate the answer to HTU ÷ U and U.t ÷ U to one or two decimal places	*"multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication"* *"use written division methods in cases where the answer has up to two decimal places"* *"divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context"*
Find fractions and percentages of whole-number quantities, e.g. 5/8 of 96, 65% of £260	Expected lower in KS2.
Use a calculator to solve problems involving multi-step calculations; carry out calculations involving time by converting hours and minutes to minutes	Calculator skills move to KS3 Programme of Study
	Adds: *"use their knowledge of the order of operations to carry out calculations involving the four operations"*
	Adds: *"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"; "divide proper fractions by whole numbers (e.g. 1/3 ÷ 2 = 1/6)" "associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (eg. 3/8)"*

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Position & Transformation	
Describe, identify and visualise parallel and perpendicular edges or faces and use these properties to classify 2-D shapes and 3-D solids	*" recognise, describe and build simple 3-D shapes, including making nets"*
Make and draw shapes with increasing accuracy and apply knowledge of their properties	*"draw 2-D shapes using given dimensions and angles"*
Visualise and draw on grids of different types where a shape will be after reflection, after translations or after rotation through 90º or 180º about its centre or one of its vertices; transform images using ICT	*"draw and translate simple shapes on the coordinate plane, and reflect them in the axes."* *Rotation moved to KS3 Programme of Study*
Use coordinates in the first quadrant to draw and locate shapes	Moves to Year 4 Becomes "*describe positions on the full coordinate grid (all four quadrants)*"
Use a protractor to estimate, measure and draw angles, on their own and in shapes; calculate angles in a triangle or around a point	*"recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles."*
	Adds: "solve problems involving similar shapes where the scale factor is known or can be found"
	Adds: "compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons"
	Adds: "illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius"

Measure	
Use standard metric units of measure and convert between units using decimals to two places notation, e.g. change 2.75 litres to 2750 ml, or vice versa	*"use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places"*
Measure and calculate using imperials units still in everyday use; know their approximate equivalent metric values	Common conversions included in Year 5 *Adds "convert between miles and kilometres"*
Read scales and record results to a required degree of accuracy, recognising that the measurement made is approximate	"*use, read, write and convert between standard units, [...], using decimal notation to up to three decimal places*"
Calculate the perimeter and area of rectilinear shapes; estimate the area of an irregular shape by counting squares	Moves to Year 4/5 Adds:"*recognise that shapes with the same areas can have different perimeters and vice versa*"; "recognise when it is possible to use formulae for area and volume of shapes"; "*calculate the area of parallelograms and triangles*"; and "*calculate, estimate and compare volume of cubes and cuboids using standard units*"

Data handling	
Describe and predict outcomes from data using the language of chance or likelihood	Probability moves to KS3 Programme of Study
Solve problems involving selecting, processing, presenting and interpreting data, using ICT where appropriate; construct and interpret frequency tables, bar charts with grouped discrete data, and line graphs; interpret pie charts; draw conclusions and identify further questions to ask	*"interpret and construct pie charts and line graphs and use these to solve problems"* No detail about data handling process is included
Describe and interpret results and solutions to problems using the mode, range, median and mean	*"calculate and interpret the mean as an average."* *(Other averages are not explicitly mentioned)*

Algebra	
using symbols for unknown quantities where appropriate	• express missing number problems algebraically • use simple formulae expressed in words • generate and describe linear number sequences • find pairs of numbers that satisfy number sentences involving two unknowns • enumerate all possibilities of combinations of two variables.

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