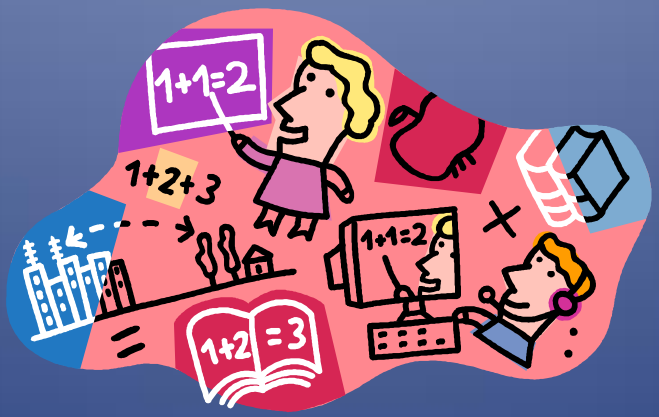


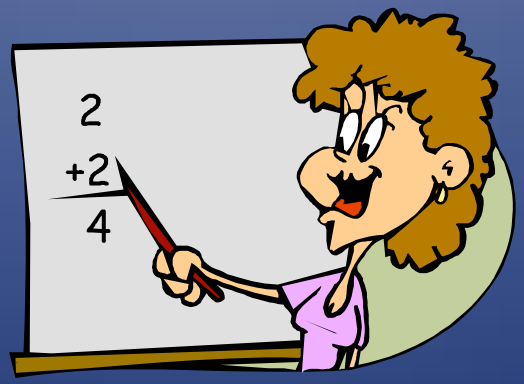


KS1 Maths Workshop



Aims

- To explain some of the methods used in school when teaching addition, subtraction, multiplication and division.
- To share ways in which you can help your child at home and the fun you can have with maths.
- To share some resources that can be used at home.



Reception Objective



Numbers:

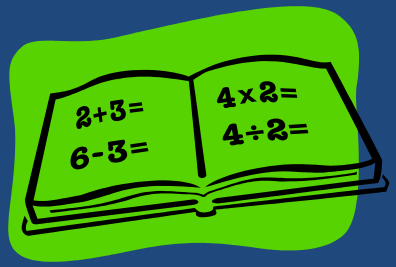
- children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing and solve practical problems combining 2,5 and 10

Shape, space and measures:

- children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

Progression of learning key mathematical concepts Year 1-6







Number, Place Value and Addition and Subtraction

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Counting	Counting to and across 100 forwards and backwards	Counting in steps of 2,3 and 5 from 0 and 10s from any number	Counting from 0 in multiples of 4,8, 50 and 100	Counting in multiples of 6,7,9,25 and 1000	Counting in steps of powers of 10 to 100,000	Counting in steps of powers of 10 to 1,000,000
Place Value	Numbers form 1 to 20	2 digits numbers (10s , 1s)	3-digit number (100s, 10s, 1s)	4-digit numbers (1000s, 100s, 10s, 1s)	Numbers to at least 1,000,000	Numbers up to 10,000,000
Addition and subtraction (mental methods)	1digit and 2digit numbers to 20, including zero.	A 2-digit numbers and ones. A 2-digit number and tens. Two 2- digit numbers. Three 1-digit numbers.	A 3-digit number and 1s. A 3 digit number and 10s. A 3-digit number and 100s.	Increasingly large numbers.	Increasingly large numbers (12,462-2,300=10,162).	Increasingly large numbers and more complex calculations.
Addition and subtraction (formal written methods)			Numbers with up to 3 digits.	Numbers with up to 4-digits.	Whole numbers with more than 4 digits.	Large numbers.

Multiplication and Division

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication and division tables		2,5 and 10 tables.	2,3,4,5,8 and 10 table .	2,3,4,5,6,7,8,9, 10,11 and 12 tables.	2,3,4,5,6,7,8,9, 10,11 and 12 tables.	2,3,4,5,6,7,8,9, 10,11 and 12 tables.
Multiplication and division (mental methods)	Solve simple 1-step problems, using concrete objects, pictorials representations and arrays with teacher support.	Calculate and write mathematical statements within the 2,5 and 10 tables using multiplication, division and equals symbols.	2-digit numbers times 1-digit numbers.	Multiplying by 0 and 1. Dividing by 1. Multiplying together 3 numbers.	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	Increasing large numbers and more complex calculations.
Multiplication and division (formal written methods)			2-digit numbers times 1-digit numbers, progressing to efficient written methods	Multiply 2-digit and 3-digit numbers by a 1- digit number	Multiply up to 4-digit numbers by a 1- or 2-digit number, including long multiplication for 2-digit numbers . Divide up to 4-digit numbers by a 1-digit number, using short division.	Multiply up to 4-digit numbers by a 2-digit number, using long multiplication. Divide up to 4-digit numbers by a 2-digit whole number, using long division.

Fractions, Decimal and Percentages

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions	A half and a quarter of an object, shape or quantity.	1/3, 1/4, 2/4 and 3/4 of length, shape, set of objects or quantity. Equivalent fractions. Write simple fractions (1/2 of 6= 3).	Tenths Unit fractions and non unit fractions with small denominators. Fractions as numbers. Equivalent fractions. Add and subtract fractions with the same denominator within one whole.	Hundredths Equivalent fractions. Add and subtract fractions with the same denominator.	Mixed numbers and improper fractions. Add and subtract fractions with the same denominator and related fractions. Write mathematical statements > 1 as a mixed number. Multiply proper fractions and mixed numbers by whole numbers.	Simplifying fractions. Equivalent fractions. Add and subtract fractions with different denominators and mixed numbers. Multiply proper fractions writing answers in simplest form. Divide proper fractions by whole numbers.
Fractions, decimals and percentages				Decimal equivalents of tenths and hundredths. Decimal equivalents of ¼, ½ and ¾ . Round numbers to 1 dp to the nearest whole number. Compare numbers with the same number of decimal places up to 2dp .	Decimal equivalents of thousandths, hundredths and tenths. Round decimals to 2 dp to the nearest 1dp and whole number. Compare numbers with up to 3 dp. Write percentage as a fraction and a decimal.	Multiply 1-digit numbers with up to 2 dp whole numbers. Use written division methods where answers has up to 2dop. Calculate percentages of whole numbers or measure (15% of 360) . Equivalents between simple fractions, decimals and percentages.

Measurement

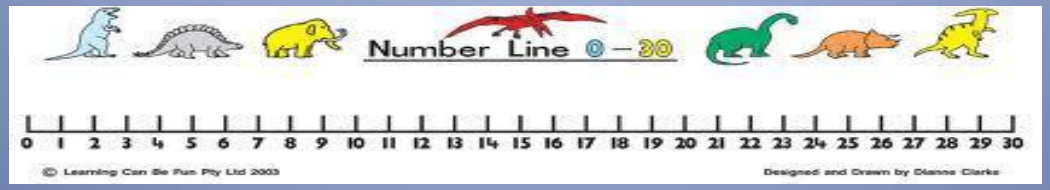
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Measurement	-Compare, describe and solve practical problems for length, height, mass, weight, capacity/ volume and time. -Measure and begin to record measurements. -Different denominations of coins and notes. -Use language of time. -Tell the time to the hour and half past.	-Standard units for length, height, mass, temperature and capacity. -Recognise and use symbols £ and p -Add and subtract money including giving change. -Tell and write the time to 5 minutes, including quarter past and quarter to.	-Measure, compare, add and subtract lengths, mass, volume/ capacity. -Perimeter of simple 2D shapes -Add and subtract money, using both £ and p. -Tell the time, including Roman numerals from I to XII, and on 12 hour and 24 hour clocks.	-Convert between units of measure. -measure and calculate perimeter of rectilinear shapes. -Find area of rectilinear shapes by counting. -Convert time between analogue and digital 12 hour and 24 hour clocks. -Convert between units of time.	-Convert between units of measure. -Equivalent metric and imperial measures. - Measure and calculate perimeter of composite rectilinear shapes. -Calculate area of squares and rectangles. -convert between units of time. -Volume and capacity.	-Convert between units of measure, using decimal notation to 3 dp. -convert between miles and kilometres. -Shapes with the same perimeter have different areas. -Calculate area of parallelograms and triangles. -Use formulae for area and volume. -Volume standard units.

Geometry

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Geometry	-Common 2D and 2D shapes. -Objects and shapes in patterns. -Half, quarter and 3-qurater turns.	Properties of 2D shapes (including symmetry) and 3D shapes. -Objects and shapes in patterns. -half, quarter and 3 quarter turns (clockwise and anti0clockwise) and movement in a straight line.	-Draw 2D and make 3D shapes. -Angles as a property of shape. -Right angles -Identify whether angles are greater or less than a right angle . -Horizontal, vertical, perpendicular and parallel lines.	-Classify quadrilaterals and triangles. -Identify acute and obtuse angles. -Identify lines of symmetry in 2D shapes. -Complete a simple symmetric shape. -Coordinate grid (1st quadrant) -Translation	-Identify 3D shapes from 2D representation. -Measure and draw angles in degrees. -identify: multiples of 90%; angles at a point: reflex angles. -regular and irregular polygons -reflect or translate a shape on a coordinate grid (1st quadrant)	-Build 3D shapes, including making nets . -Classify shapes -Find unknown angles in triangles, quadrilaterals and regular polygons -Circles: circumference, radius and diameter. -Find unknown angles at a point, on a straight line, vertically opposite. -Coordinates (all four quadrants) -translate and reflect shapes on coordinate grid

Mental Maths In Key Stage 1

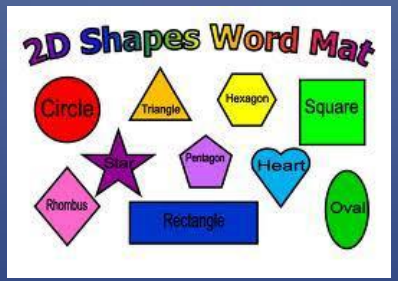
- Counting in ones, twos, fives and tens. Counting forward and back, from 1 to 20, and later from 0 to 100. There is extensive use of number lines and 1 to 100 number square.



- Counting objects or events (e.g. hand-claps, jumps) Counting groups of objects.
- Extending their mathematical vocabulary (in Year 1 sometimes with stories)
- Rehearsing concepts and skills which have already been introduced or taught (e.g. more than/less than, add and takeaway, sharing and groups of)
- Practising recall of number facts (e.g. number bonds to 10, (then 20), multiples of 10 number bonds to 100, 2 x, 5 x and 10 x times table, number facts for numbers up to 20)



- Rehearsing the order of the days of the week and months of the year.
- Beginning to learn the names of 2D and 3D shapes.



Strategies used at school

- We all think differently and maths is no exception. We arm the children with a variety of methods of calculating and then encourage them to explore what works best for them.
- We place great emphasis on mental calculation strategies and we aim for the children to be able to understand and use their mental calculation strategies in order to progress towards written methods, firstly informal, then more formal as their knowledge and understanding develops
- Children are not introduced to formal written calculations until Year 3. Writing in a prescribed way is not necessary but talking and explaining is encouraged.
- Children are always encouraged to make a sensible estimate whenever carrying out a calculation, so they are able to consider whether their final answer is reasonable.

Strategies used at school

Before they learn to set out calculations in columns, the aim is for all children to be able to add and subtract mentally (i.e. without any aids) any pair of two digit numbers.

We delay traditional 'vertical' layouts for more difficult calculations, such as those involving several two digit numbers or three or four digit numbers.

We frequently use both open and labelled number lines and hundred squares to aid children with their mental addition and subtraction.

Counting on method

To support children in moving from a counting all strategy to one involving counting on, children should still have two groups of objects but one should be covered so that it cannot be counted. For example, when calculating 4 + 2, count out the two groups of counters as before.



Then cover up the larger group with a cloth.



For most children, it is beneficial to place the digit card on top of the cloth to remind the children of the number of counters underneath. They can then start their count at 4, and touch count 5 and 6 in the same way as before, rather than having to count all of the counters separately as before.

Base 10 Equipment

Base 10 equipment to make teens numbers using separate tens and units.
For example, when adding 11 and 5, they can make the 11 using a ten rod and a unit.



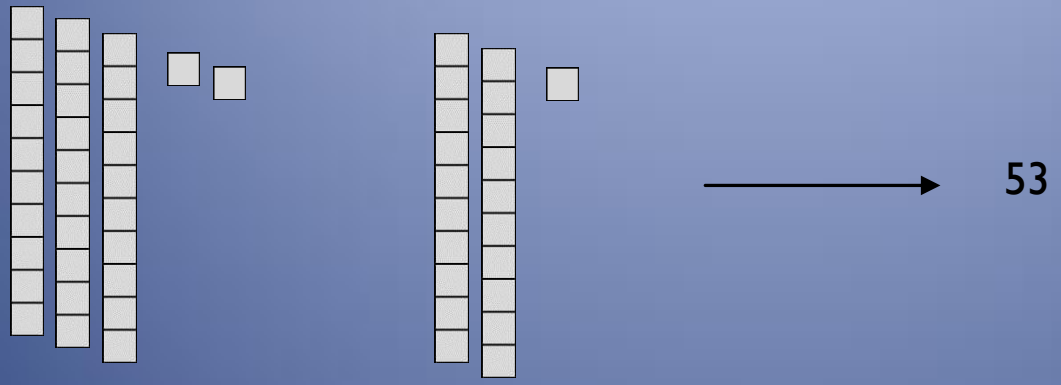
The units can then be combined to aid with seeing the final total, e.g.



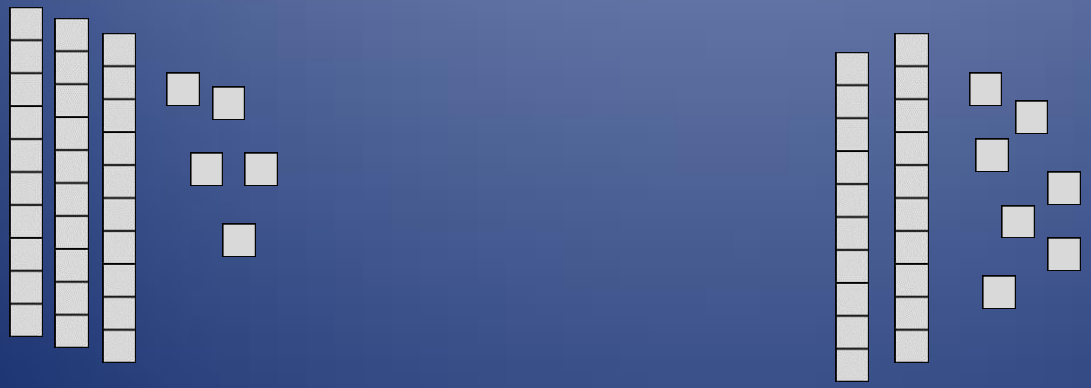
so 11 + 5 = 16. If possible, they should use two different colours of base 10 equipment so that the initial amounts can still be seen.

Base 10 Equipment

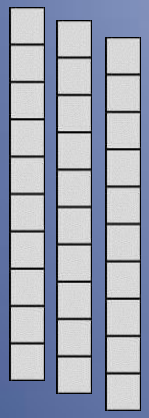
Children will continue to use the Base 10 equipment to support their calculations. For example, to calculate 32 + 21, they can make the individual amounts, counting the tens first and then count on the units.

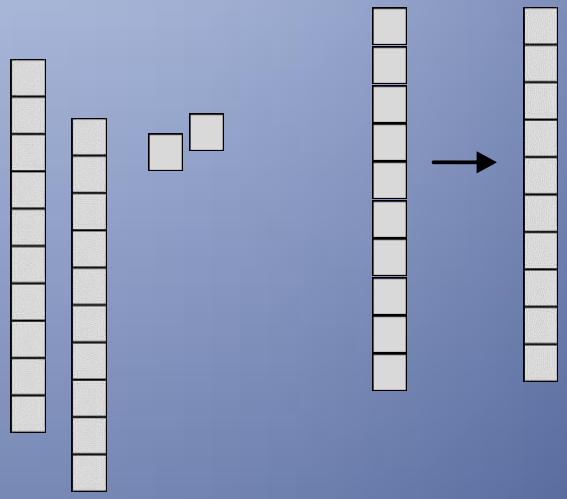


When the units total more than 10, children should be encouraged to exchange 10 units/ones for 1 ten. This is the start of children understanding 'carrying' in vertical addition. For example, when calculating 35 + 27, they can represent the amounts using Base 10 as shown:

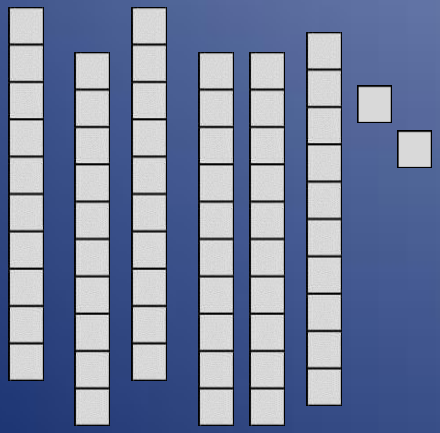


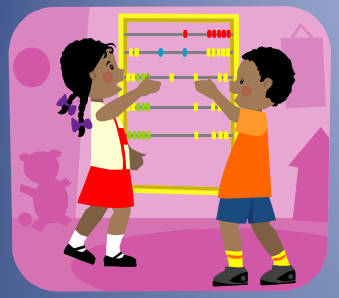
Then, identifying the fact that there are enough units/ones to exchange for a ten, they can carry out this exchange:



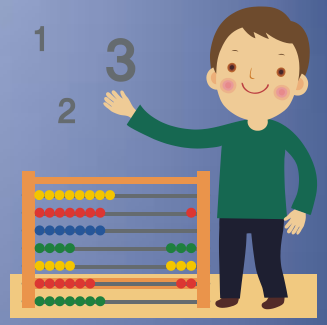


To leave:





Using Place Value



31+26=

30+20=50

1+6=7

50+7=57

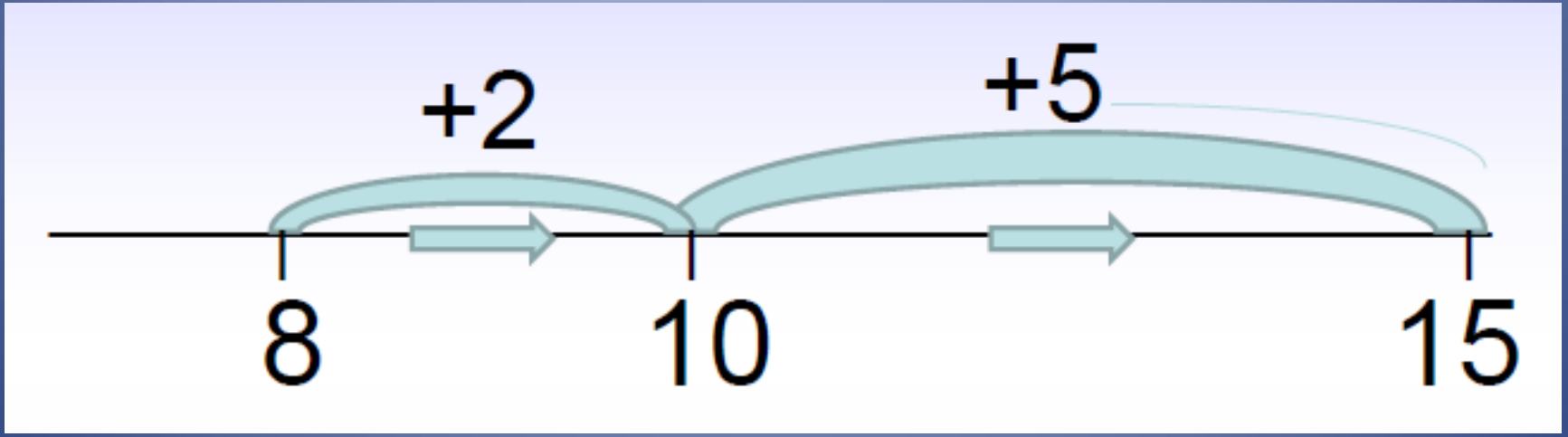
31+20=51

51+6=57

26+30=56

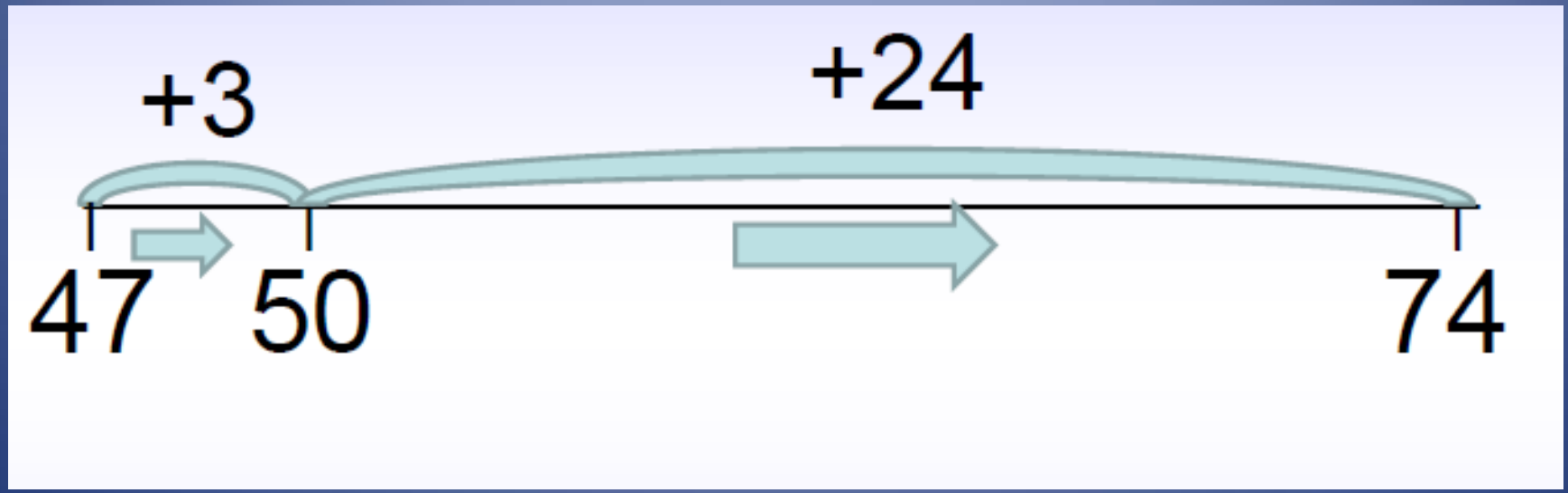
56+1=57

Addition Using the Empty Number Line



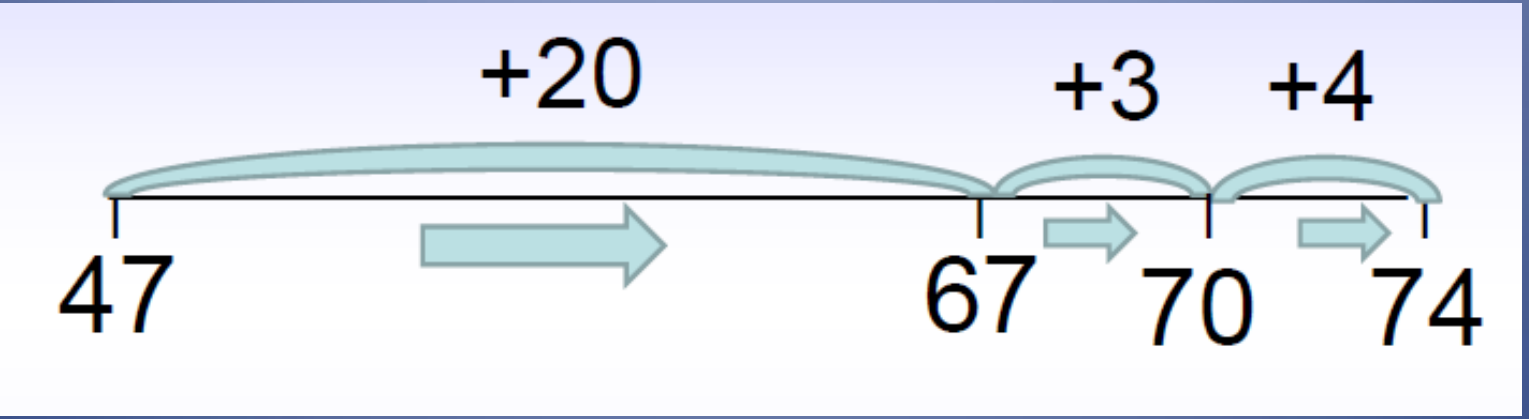
8 +7=15

Addition Using the Empty Number Line



47 +27= 74

Addition Using the Empty Number Line



47+27=74

Partitioning

24+65= (20+60) + (4+5)

= 80 + 9

= 89

Now try some yourself!

28+17

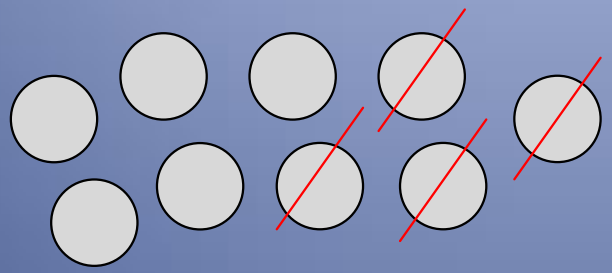
35+57

134+58

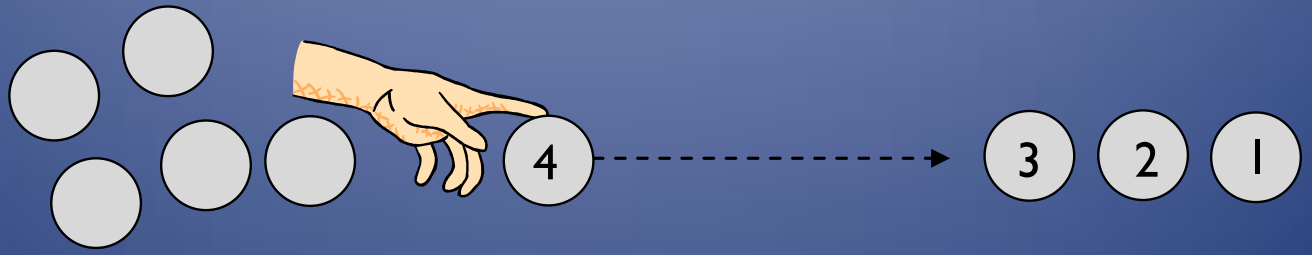
74+69

Subtraction

Children will begin to develop their ability to subtract by using practical equipment to count out the first number and then remove or take away the second number to find the solution by counting how many are left e.g. 9 – 4.



Children would be encouraged to physically remove these using touch counting.



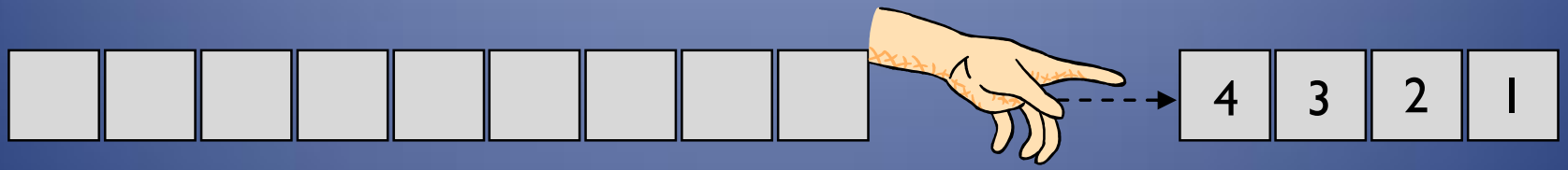
By touch counting and dragging in this way, it allows children to keep track of how many they are removing so they don't have to keep recounting. They will then touch count the amount that are left to find the answer.

Subtraction
Base 10 Equipment

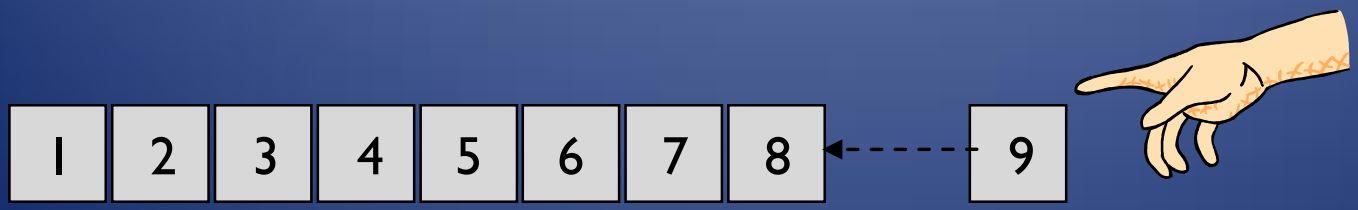
13-4=



Touch count and remove the number to be taken away, in this case 4.

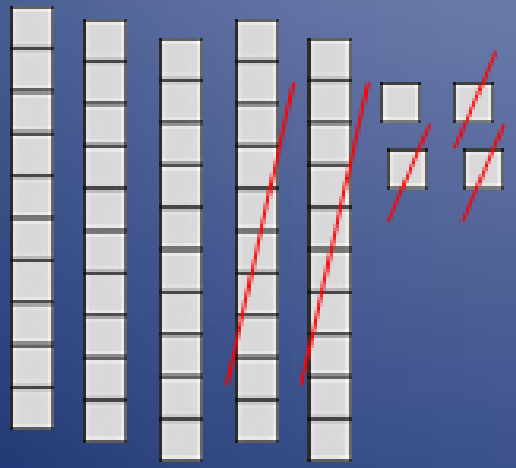


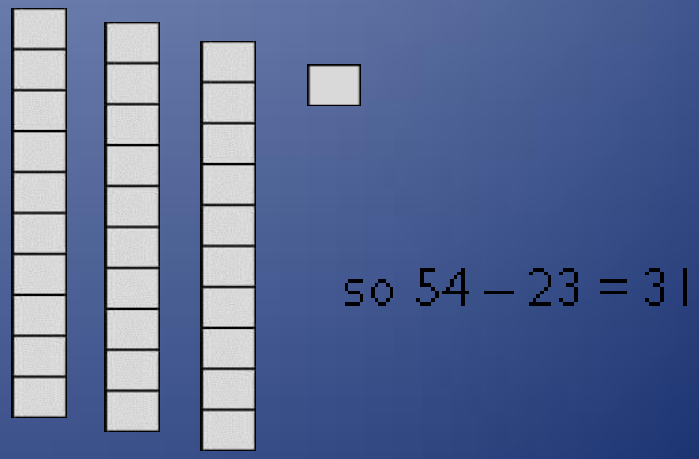
Touch count to find the number that remains.



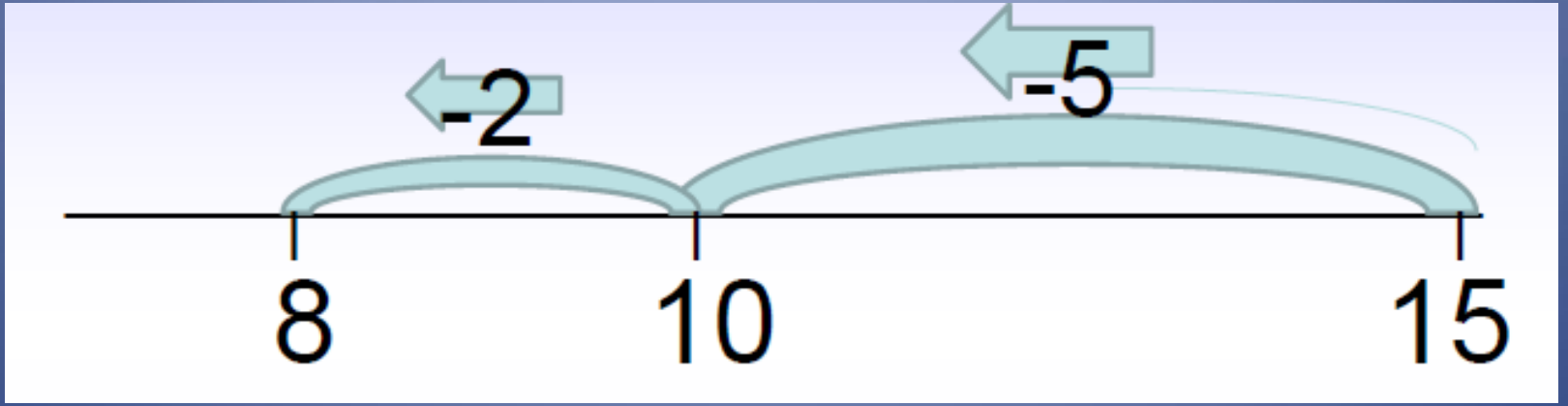
Subtraction
Base 10 Equipment

Children will begin to use the Base 10 equipment to support their calculations, still using a take away, or removal, method. They need to understand that the number being subtracted does not appear as an amount on its own, but rather as part of the larger amount. For example, to calculate 54 - 23, children would count out 54 using the Base 10 equipment (5 tens and 4 units). They need to consider whether there are enough units/ones to remove 3, in this case there are, so they would remove 3 units and then two tens, counting up the answer of 3 tens and 1 unit to give 31.



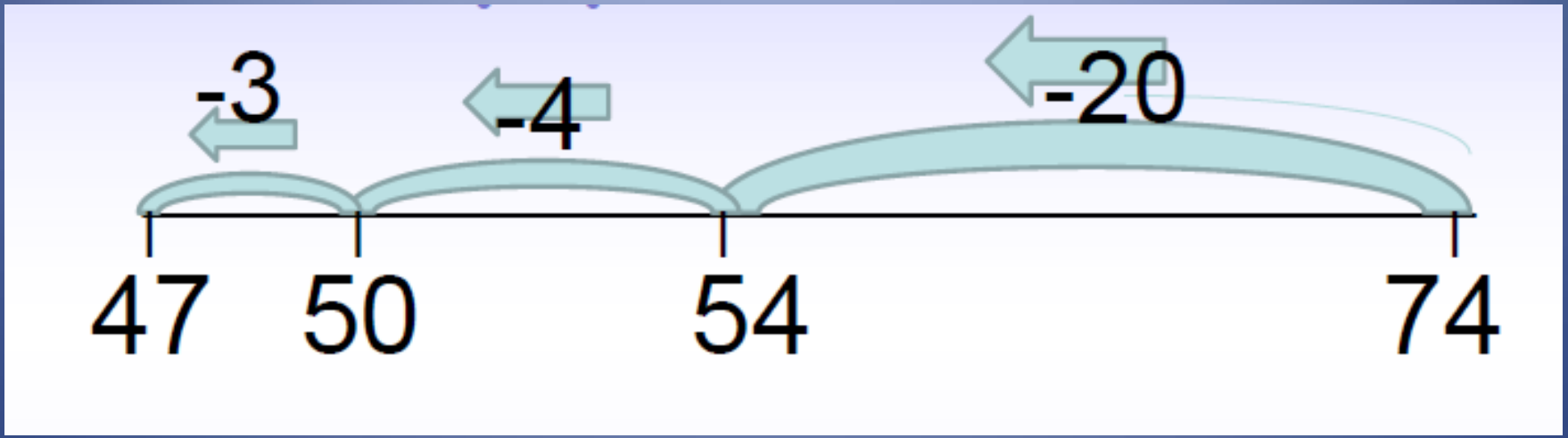


Subtraction Using the Empty Number Line



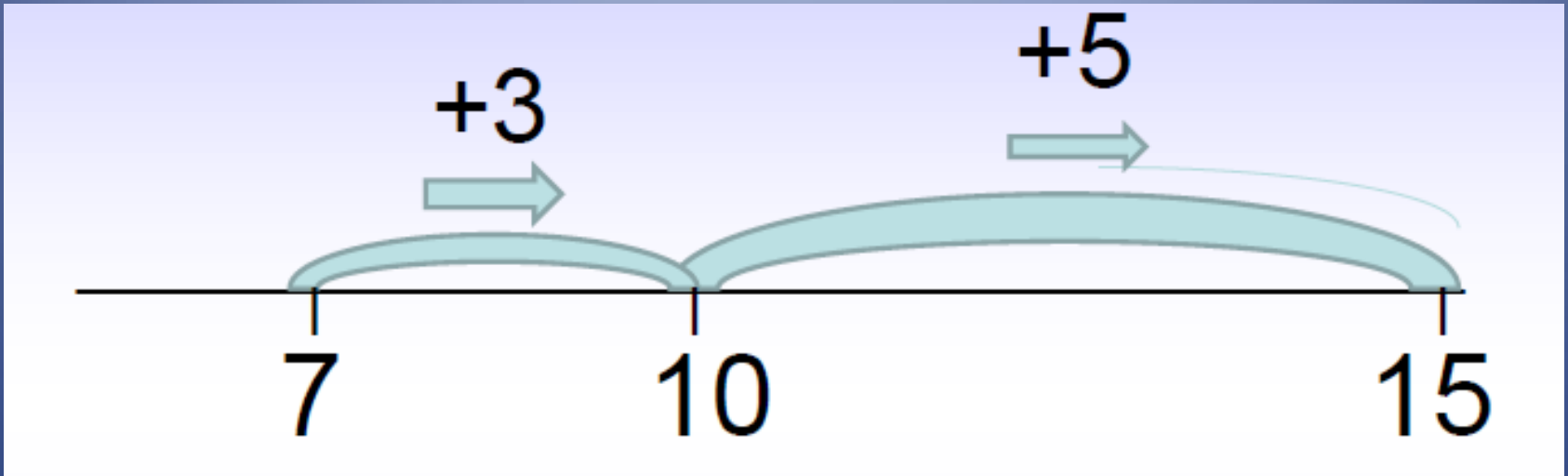
15-7=8

Subtraction Using the Empty Number Line



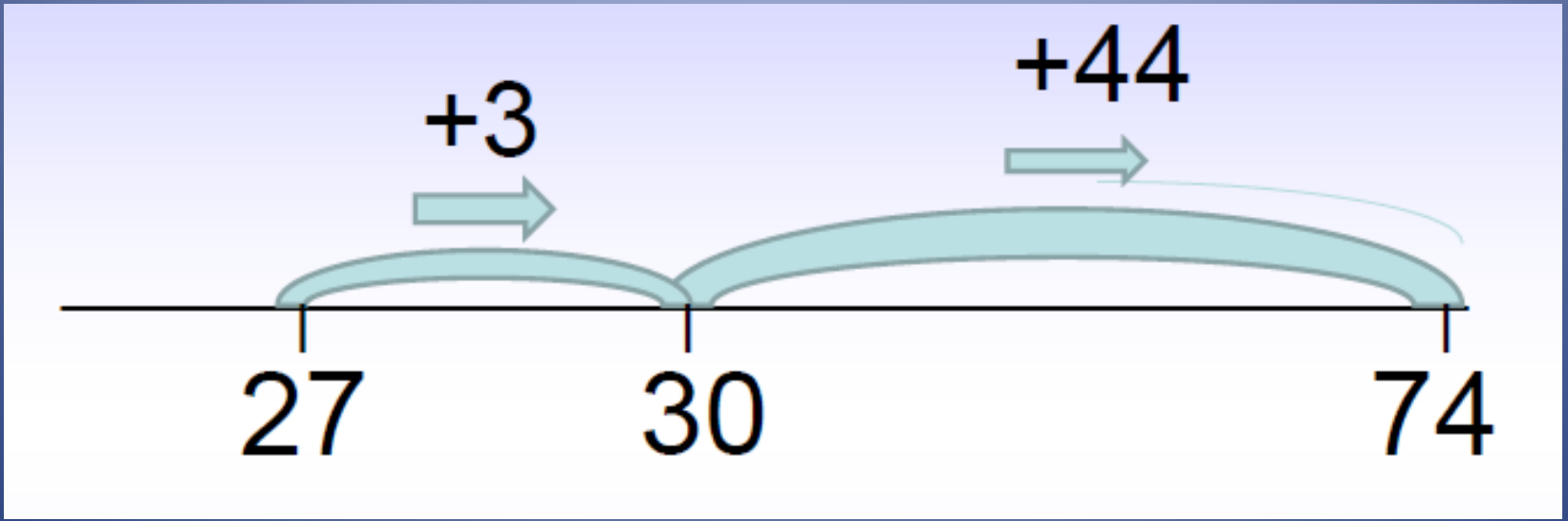
74-27=47

The Counting Up Method



15-7=8

The Counting Up Method



74-27=47

Your turn!

43-17

81-32

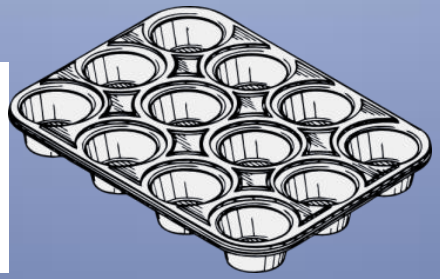
130-58

112-65

Multiplication

Children will investigate putting items into resources such as egg boxes, ice cube trays and baking tins which are arrays.





They may develop ways of recording calculations using pictures, etc.



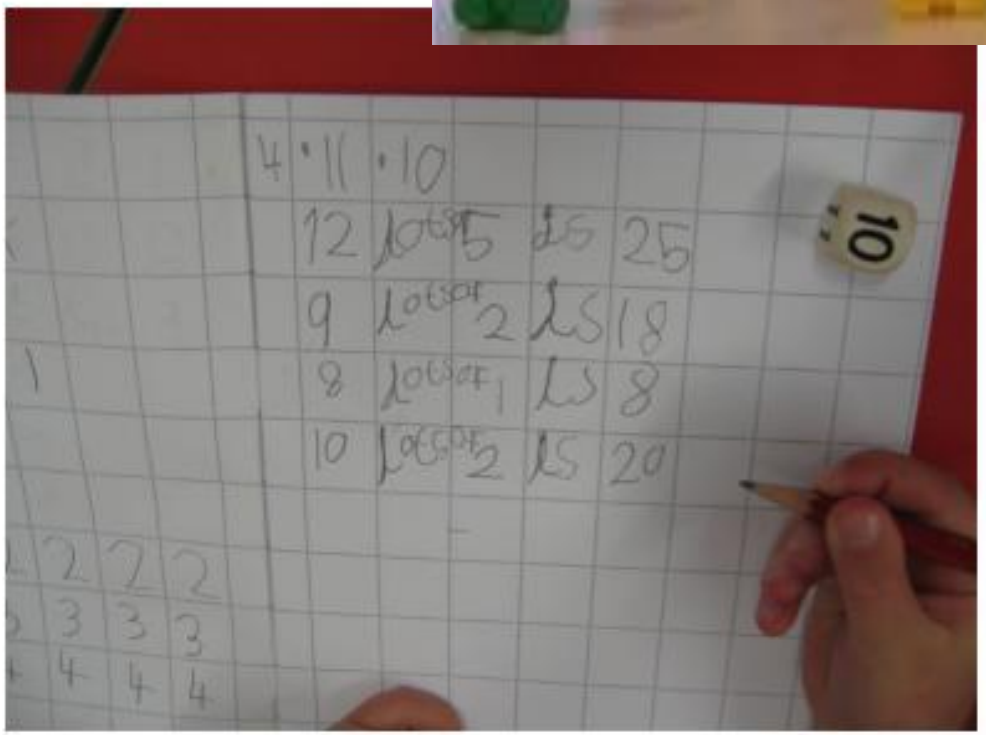
A child's jotting showing the fingers on each hand as a double.

A child's jotting showing double three as three cookies on each plate.



Multiplication

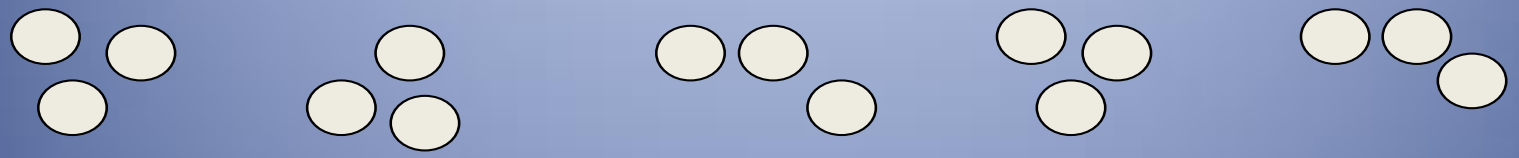




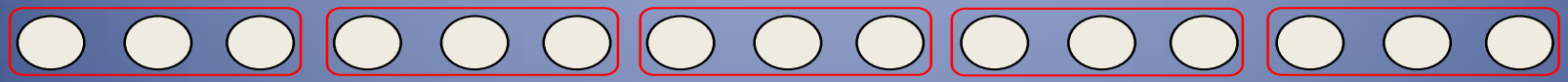
Children are taught about 'lots of' or 'sets of' and see the link between multiplication and repeated addition.

Children should understand and be able to calculate multiplication as repeated addition, supported by the use of practical apparatus such as counters or cubes. e.g.

5 x 3 can be shown as five groups of three with counters, either grouped in a random pattern, as below:

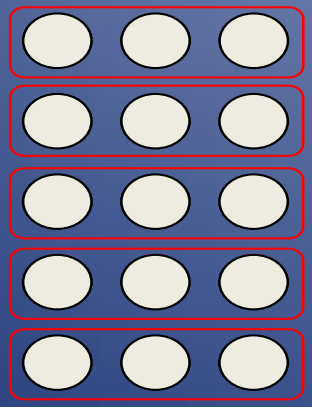


or in a more ordered pattern, with the groups of three indicated by the border outline:

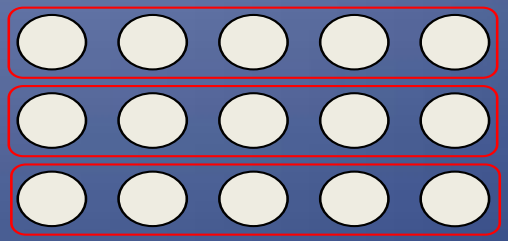


Children should then develop this knowledge to show how multiplication calculations can be represented by an array, (this knowledge will support with the development of the grid method in the future). Again, children should be encouraged to use practical apparatus and jottings to support their understanding, e.g.

5 x 3* can be represented as an array in two forms (as it has commutativity):



3 + 3 + 3 + 3 + 3 = 15

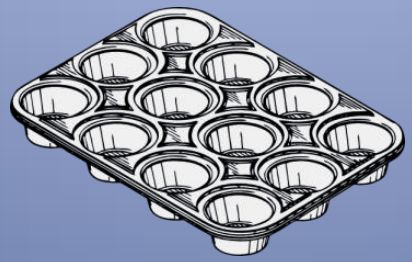


5 + 5 + 5 = 15

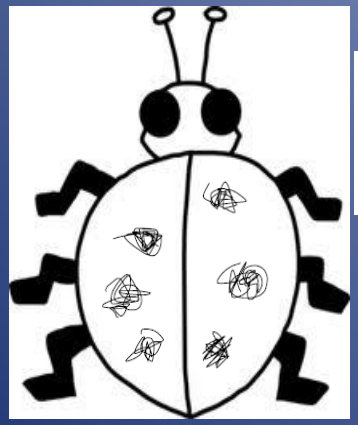
Division

Children will investigate sharing items or putting items into groups using items such as egg boxes, ice cube trays and baking tins which are arrays.



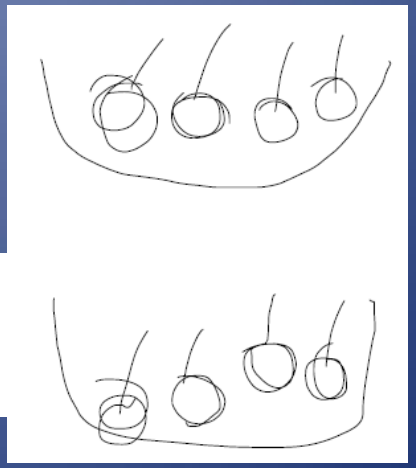


They may develop ways of recording calculations using pictures, etc.



A child's jotting showing halving six spots between two sides of a ladybird.

A child's jotting showing how they shared the apples at snack time between two groups.



Division

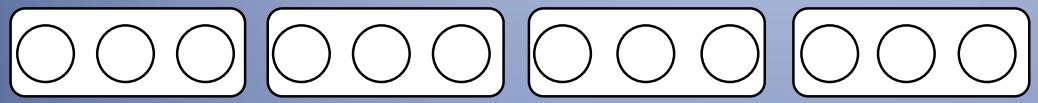
Generally, children will use the inverse of their multiplication tables to work out division problems mentally, at this stage.

They will also be taught how to separate a group of objects into sets, to learn the notion of division as 'sharing'.



Children will utilise practical equipment to represent division calculations as grouping (repeated subtraction) and use jottings to support their calculation, e.g.

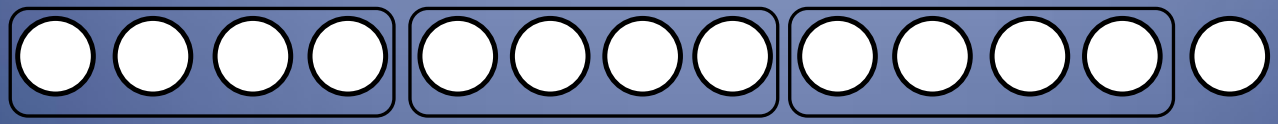
12 ÷ 3 =



Children need to understand that this calculation reads as 'How many groups of 3 are there in 12?'

They should also continue to develop their knowledge of division with remainders, e.g.

13 ÷ 4 =



13 ÷ 4 = 3 remainder 1

Children need to be able to make decisions about what to do with remainders after division and round up or down accordingly. In the calculation 13 ÷ 4, the answer is 3 remainder 1, but whether the answer should be rounded up to 4 or rounded down to 3 depends on the context, as in the examples below:

I have £13. Books are £4 each. How many can I buy?
Answer: 3 (the remaining £1 is not enough to buy another book)

Apples are packed into boxes of 4. There are 13 apples. How many boxes are needed?
Answer: 4 (the remaining 1 apple still needs to be placed into a box)

Ways you can help at home



Resources

Have a think about what you have around the house that you could use to create fun maths!











Ideas for KS1 parents at home

- Counting games (e.g. Snakes & Ladders, Ludo and any dice games)
- Recognising numbers when out and about (e.g. house numbers, bus numbers, car number plates, aisle numbers in supermarkets etc.)
- Using real money
- Counting when out and about (e.g. counting steps, cars and colours, carrots in a bag in supermarkets etc.)
- Recognising shapes (e.g. buildings, windows, food packaging etc.)
- Helping in the kitchen (e.g. weighing ingredients, time duration, counting out numbers of sausages/fish fingers/potatoes etc.)
- Foam bath numbers/magnetic fridge numbers
- Posters in bedrooms (e.g. 1-100 square, multiplication square). Put these at children's eye level- next to their bed is perfect!
- Timed warnings (e.g. count down from 10-0 for small tasks such as putting on their shoes)
- 'I'm thinking of a number' type games.
- Using mathematical vocabulary, eg: How many more do I need?, Is your bag heavier than Tom's?, etc.

Cooking



- measuring
- reading scales with different intervals
- capacity and weight
- time
- simple fractions (half/quarter).



Using money

- Discuss how much items cost in shops and the value of things
- Compare value of different items, eg: a chocolate bar is about the same value/price/cost as an apple, etc. A dvd costs about the same as 20 chocolate bars.
- Work out what coins they need to pay for something simple and talk about how much change they will have left over;
- Imaginary shopping lists
- Role play.
- Use the vocabulary of money; change, coins, price, cost

Dice games are an easy and fun way to help your child/children to practise their basic number skills. The following are examples which are easy/quick to play and set up:

1. Don't roll 1:

Aim is to reach 100, 2 or more players, 2 dice.

2. Odds and Evens:

Aim is to reach 50, 2 players, 2 dice.

Decide who is 'Odd' and who is 'Even'

Each player rolls a dice, add the 2 numbers together. Decide whether total is odd or even. If it is odd, that number goes to the 'odd' person; if it is even it goes to the 'even' person. Both players roll again and repeat the process. Keep a running total until one player reaches 50.

3. Aim for 30

Aim is to get as close to 30 by making a calculation with 3 dice numbers (each player has 3 chances to roll the dice).

2 or more players, 3 dice.

First player rolls all 3 dice and decides whether to stick with one or more of the numbers. If he/she wants to, toss the remaining dice. Again, decide which number or numbers to stick with and put those aside. Take the last go-roll any remaining dice. Now use the three dice numbers to make a calculation using any of the 4 operations. (+, -, x, /). Everybody takes turns and whoever is closest is the winner.

Dice Games…..continued……

4. Three in a Row

Aim is to make a row of three counters on a 6x6 multiplication grid. 2 players, 2 dice, lots of counters.

Roll both the dice and multiply numbers together.

Put a counter on the answer (eg: if 2 and 3 were rolled,

a counter could be placed on any 6)

Next player has a turn and play continues until one player

gets 3 in a row (horizontally,

vertically or diagonally).

	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18
4	4	8	12	16	20	24
5	5	10	15	20	25	30
6	6	12	18	24	30	36

Numberless

If all the numbers in the world were rubbed out, removed, taken away:
I wouldn't know how old I was,
I wouldn't know the time of day,
I wouldn't know which bus to catch,
I wouldn't know the number of goals I had scored,
I wouldn't know how many scoops of ice-cream I had,
I wouldn't know the page on my reading book,
I wouldn't knowhow tall I was,
I wouldn't know how much I weighed,
I wouldn't know how many sides there are in a hexagon,
I wouldn't know how many days are in the month,
I wouldn't be able to work my calculator.
And I wouldn't be able to play hide-and-seek!
But I would know
As far as my mum was concerned,
I was still her NUMBER ONE!
Ian Souter