KINELLAR SCHOOL

Numeracy Guidance for Parents and Families

This document provides some guidance for parents on how number is taught at Kinellar School. We hope that this will assist you in helping your child with their numeracy development.

Should you ever have any questions about the teaching of numeracy in school then please do not hesitate to contact your child's class teacher.

Useful links:

Education City

Top Marks

White Rose Maths

Nrich maths

Maths Frame

BBC bitesize

Maths Boxes

Kinellar Parent Council kindly funded the purchase of materials to create 'Maths boxes' for each coloured area of the school. Each of these boxes contain a variety of concrete materials which can be used to support children's development in Numeracy.

This is a small selection of some of the resources we have available.

What are concrete materials?

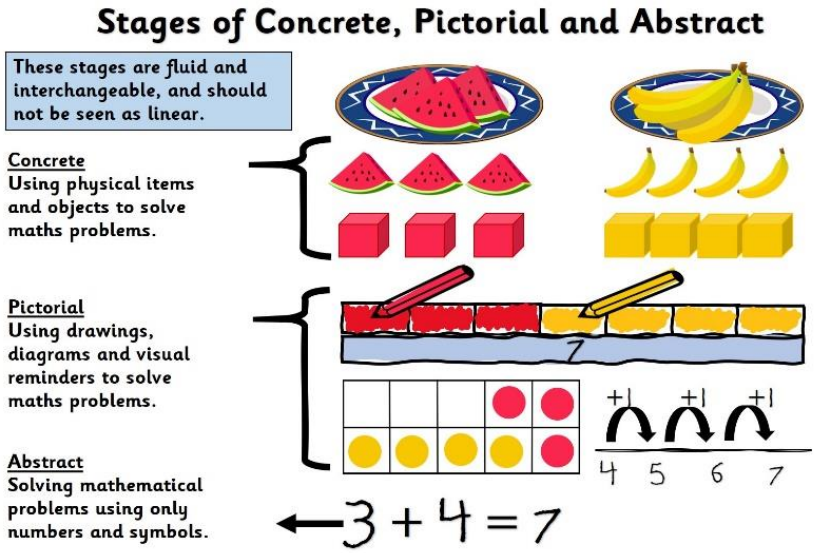
Concrete materials are physical resources that children can handle and manipulate to support their understanding of specific concepts. For this reason, they are sometimes called manipulatives.

Who uses concrete materials?

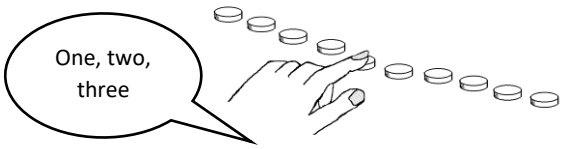
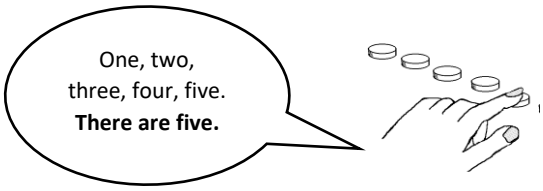
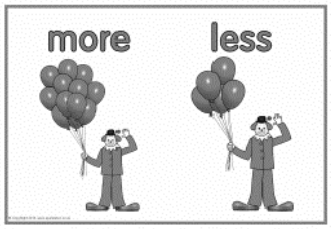
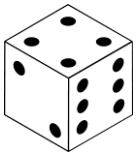
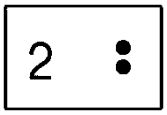
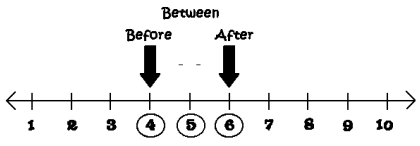
We encourage the use of concrete materials at **all stages** across the school. They should not be seen as something a child should 'grow out' of using. We are actively trying to change the way pupils view these as some still feel there is a stigma attached to using them.

They will be used very differently at different stages of Numeracy development. They could be used to support addition or subtraction in the early stages or to solve a problem involving equivalent fractions or percentages in the upper stages. Children are encouraged to use concrete materials to model a complex problem in order to solve it.

Once children are familiar with the **concrete** elements, they will have the tools and strategies to begin to solve **pictorial** representations of problems then ultimately, they will use the **abstract** symbols. The abstract stage involves the use of only numbers, notation and mathematical symbols (+ -, x, ÷). Children often find maths difficult because it is abstract. By using concrete materials, it will help develop their number sense and help them to visualise the problems and strategies used to solve them.

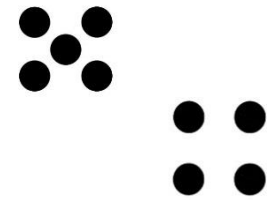
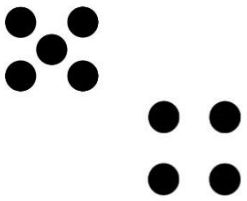
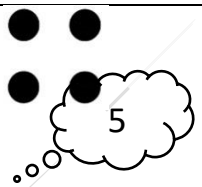


Counting Strategies

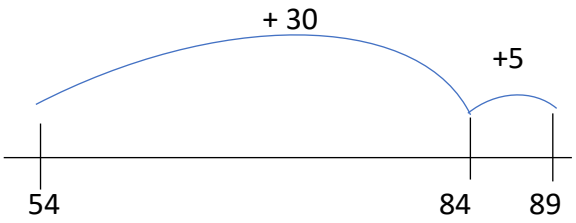
Counting Concrete Items **Encourage children to say a number as they touch each item.**	
Total Amount **Knowing that the final number said is the total amount.**	
More or Less **I can count the objects and say which has more or less.**	
Identifying Amounts **Recognising an amount of items up to 6 without counting each one.**	
Recognise and Write **Be able to recognise and write numbers to 10.** **Recognise that a number (digit) represents an amount.**	
Before and After **Identify the number before / after /in between given numbers.**	

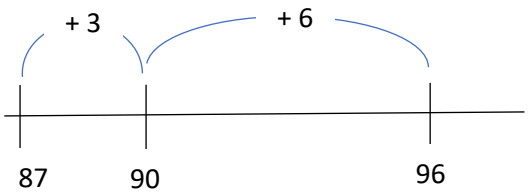
Counting On **Counting on from a number greater than 1**	4, 5, 6, 7…
Counting Back **Counting back from a number**	9, 8, 7, 6…

Mental Addition Strategies

By Counting **Adding two groups of items by counting all items one by one.**	 1, 2, 3, 4, 5, 6, 7, 8, 9
By Counting On **Adding two groups of items by counting on from the largest number.**	 5 6, 7, 8, 9
By Visualising **Visualise a number then add an amount to it.**	 6, 7, 8, 9
Number Stories **Learn and remember stories of numbers to ten.**	Eg. Story of 6: 6+0=6, 5+1=6, 4+2=6, 3+3=6
Partitioning (one number) **Breaking one number into smaller numbers, before adding it in stages. This is called partitioning.**	8 + 17 = 8 + 7 + 10 =15 + 10 = 25 72 + 16 = 72 + 10 + 6 = 82 + 6 = 88
Partitioning (Both numbers) **Split both numbers using Place Value groupings.**	45 + 37 = 40 + 5 + 30 + 7 = 40 + 30 + 5 + 7 = 70 + 12 = 82 437 + 342 = 400 + 30 +7 + 300 + 40 + 2 = 400 + 300 + 30 + 40 + 7 + 2 = 700 + 70 + 9 = 779

This method can be used for larger numbers too.		

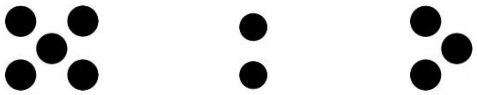
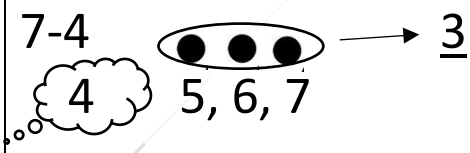
Empty Number Line **Place the larger number on the left of an empty number line. Use partitioning to split the second number.**	**54 + 35 = 89** 
Using Simpler Facts **Use knowledge of number bonds to add larger numbers together.**	2 + 5 = 7 200 + 500 = 700 2000 + 5000 = 7000 0.2 + 0.5 = 0.7
Compensating (Adding 9) Add 10 and subtract 1 when adding 9.	87 + 9 87 + 10 = 97 97 – 1 = 96
Compensating (moving numbers) **Move part of one number from one side of the sum to the other, making one number a multiple of 10.**	49 + 38 = (49+1) + (38-1) = 50 + 37 = 87 49 + 38 = 49 + (38**+2**) = 49 + 40 = 89 **– 2** **= 87**
Estimating **Round both numbers in the sum to the nearest 10, 100 etc. to check accuracy.**	39 + 57 = 96 40 + 60 = 100
Doubles/Near Doubles **Adding doubles is an easy way to complete an addition sum.** **If it is a 'near double', make it a double by adding or subtracting to make the two numbers equal.**	16 + 17 = 16 + (16+1) = 16 + 16 + 1 = 32 + 1 = 33

Friendly Numbers **Two numbers that add together to make 10 or a multiple or 10.**	34 + 26 = 30 + 4 + 20 + 6 = 30 + 20 + 4 + 6 = 50 + 10 = 60
Bridging Through 10 **Use friendly numbers to reach a multiple of 10 when adding.**	87 + 9 = 96 

Written Addition Strategies

Column Method – Chimney Sums **Add each column in the sum working from right to left.**	65 +12 77
Column Method – Chimney Sums Involving carrying **Add each column as before. If the total is 10 or more record the units and carry the tens. Place the number you are carrying under the next column. Add this column, remembering to add on any numbers you have carried.**	368 + 423 791 1 4536 +3726 8262 1 1

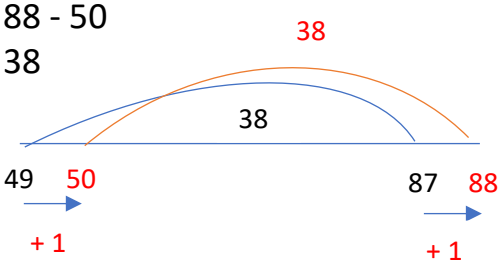
Mental Subtraction Strategies

By Counting **Count a group of items, remove a set amount then count how many are left.**	5 – 2 = 3 
Counting Backwards **Put the biggest number first then count back.**	7-4  6, 5, 4, 3
Counting On **Start with the smallest number and count on to the biggest number.**	7-4  4 5, 6, 7 → 3
Counting Back using Partitioning **Partition the smaller number and count back in chunks**	123-69 = 123-(20+40+3+6) = 103 – 40 – 3 – 6 = 63 – 3 – 6 = 60 – 6 = 54
Reordering **As long as the biggest number in the calculation comes first it does not matter the order of the other numbers when subtracting more than one number.**	25 – 6 – 5 25 (-6) -5 = 20 – 6 = 14 25 – 6 – 5 25 – 6 (-5) = 19 – 5 = 14

Keep a Constant Difference

Round the number to the closest multiple of 10. Adjust the other number by the same amount. Complete the sum using the 'new' numbers.

87 - 49
= (87+1) - (49 +1)
= 88 - 50
= 38



Subtracting Friendly Numbers

Use knowledge of friendly numbers to aid subtraction.

Remember friendly number are two numbers that add together to make 10 or a multiple or 10.

23 – 3 – 7 – 4
23 – (3+7) – 4
23 – 10 – 4 = 9 (Can complete in one step)

23 – 10 = 13 (or break it down further)
13 – 4 = 9

Compensation

Round one of the numbers to the nearest 10. Adjust the final answer accordingly to keep the calculation 'balanced'.

79 - 26
= (79**+1**) – 26
= 80-26=54
= 54 **- 1** (subtract 1 because an extra was added)
= 53

81 – 37
= (81**-1**) – 37
= 80 – 37 = 43
= 43 **+ 1** (add 1 because an extra 1 was subtracted)
= 44

87 - 49
= 87 - (49**+1**)
= 87 - 50
= 37 **+ 1** (add 1 because an extra 1 was subtracted)
= 38
(This is the same as keeping a constant difference)

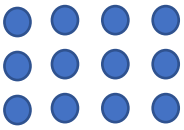
95 – 61
= 95 – (61**-1**)
= 95 – 60
= 35
= 35 **– 1** (subtract 1 because one less was subtracted)
(This is the same as keeping a constant difference)

<u>Compensation (Subtracting 9)</u> **Take away 10 from the number and add 1 back on to the answer.**	48 – 9 48 – 10 = 38 38 + 1 = 39

Written Subtraction Strategies

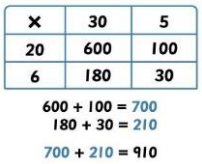
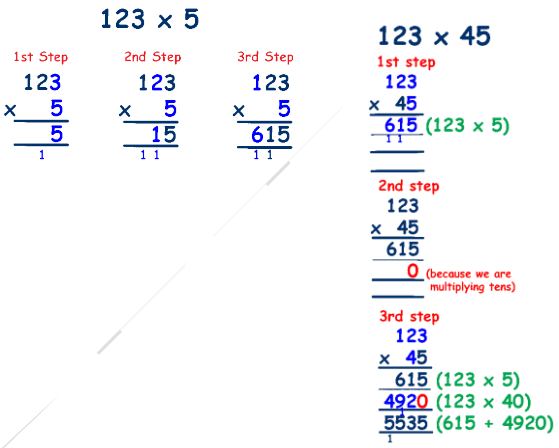
Column method - (Chimney Sums) **Subtract each column in the sum working from right to left. Make sure the larger number is on top.**	564 - 232 332
Column method - (Chimney Sums) Involving exchanging **Subtract each column in the sum working from right to left. You may have to exchange if the number on the top of the column is smaller than the one underneath.** **When exchanging, look to the next available column to the left. If possible, take one from this column and bring it to the one you are working on. Remember to record this appropriately – see example. If this is a 0, look to the next column to the left.**	7 1 6 8 3 - 5 2 6 1 5 7 9 6 7 1 1 7 1 0 2 4 - 5 6 5 1 1 3 7 3

Mental Multiplication Strategies

Multiplication Facts **Knowing and understanding the times tables up to 10**	2 x 1 = 2 2 x 2 = 4 2 x 3 = 6
Repeated Addition **Adding the same number repeatedly.**	6 x 15 =15+15+15+15+15+15 Or 15+15 = 30 30+15 = 45 45+15 = 60 60+15 = 75 75+15 = 90
Friendly Numbers **Changing the question to multiply by a more friendly number. Adjust answer appropriately.**	9 x 15 10 x 15 = 150 150 - 15 = 135
Commutative Rule **Knowing that the order of the numbers in addition and multiplication is not important.**	Example A: 4 x 25 = 25 x 4 Example B: 40 x 5 x 2 = 5 x 40 x 2 = 5 x 2 x 40
Array **An array is a set of objects set out in rows and columns. Each column contains the same number of objects as other columns. Each row also contains the same number of objects as other rows.**	 1 x 3 or 3 x 1  4 x 3 or 3 x 4

Factoring Numbers **Breaking down numbers into their factors.**	36 x 4 = 6 x 6 x 4
Partitioning **Splitting up numbers into friendly numbers or place value.** **Split the first number into tens and units. Multiply the second number by each of these. This number can be broken down again if required.** **Add the two answers together to give your final answer.**	34 x 23 30 4 20 3 30 x 23 30 x 20 = 600 30 x 3 = 90 600 + 90 = 690 4 x 23 4 x 20 = 80 4 x 3 = 12 80 + 12 = 92 690 + 92 = 782
Doubling and Halving **When you double one number in a multiplication problem the other is halved. This process can be repeated several times.**	12 x 24 *(÷2) (x2)* 6 x 48 *(÷2) (x2)* 3 x 96

Written Multiplication Strategies

Grid Method **Splitting numbers into friendly numbers or place value to break down larger multiplication problems.**	35 x 26 
Column Method **Setting out the numbers in columns in order to work through multiplication problems from units through the place value columns in order.** **Numbers with a greater place value than the column they are in are carried and added to the next column.**	

Mental Division Strategies

Partitioning/Splitting number **Split larger numbers into smaller "friendlier" numbers and divide in stages.**	69 ÷ 3 60 ÷ 3 = 20 9 ÷ 3 = 3 20 + 3 = 23 So, 69 ÷ 3 = 23 7200 ÷ 9 72 ÷ 9 = 8 So, 7200 ÷ 9 = 800
Dividing using factors **Sometimes a calculation is easier if you break up the divisor into its factors, and divide by each one in turn.**	96 ÷ 6 6 = 3 x 2 = (96 ÷ 3) ÷ 2 = 32 ÷ 2 = 16 156 ÷ 12 12 = 3 x 4 12 = 3 x 2 x 2 = (156 ÷ 3) ÷ 2 ÷ 2 = (52 ÷ 2) ÷ 2 = 26 ÷ 2 = 13
Repeated Subtraction **Count how many times you can take the smaller number away from the larger number.**	24 ÷ 6 24 – 6 – 6 – 6 - 6 = 0 So, 6 x 4 = 24, therefore, 24 ÷ 6 = 4
Halving Even Numbers **To divide an even number by another one, half both numbers (that is divide them by 2) then keep halving them until the question is simple enough to solve.**	112 ÷ 28 (÷ 2) = 56 ÷ 14 (÷2) = 28 ÷ 7 = 4

Written Division Strategies

Short Division

Short division is a method that works well for dividing by numbers less than 10. Write the calculation as shown then divide into each digit in turn, starting with the first digit, and write each result above it. Then read the digits to get the final answer.

84 ÷ 4

Write each answer along the top of the line:
80 ÷ 4 (this could be thought of as) 8 ÷ 4 = 2
4 ÷ 4 = 1

Then read off the numbers to get the final answer: 21

```
   T  U
   2  1
4 | 8  4
```

Short Division – With Remainders

If you can't divide a digit exactly, write the remainder in front of the next digit and divide into this new number you have made. If you have a remainder at the end of your calculation, include it in your answer as a remainder.

98 ÷ 4

```
   2  4  r 2
4 | 9 18
```

So, 98 ÷ 4 = 24 r 2

9 ÷ 4 = 2 r 1
Write the 1 in front of the 8:
18 ÷ 4 = 4 r 2

Short Division – with decimal remainders

If you can't divide a digit exactly, write the remainder in front of the next digit and divide into this new number you have made. If you have a remainder at the end of your calculation this can be recorded as a decimal.

98 ÷ 4

```
   2  4 . 5
4 | 9 18 .20
```

Insert a decimal point above and below the line. Below the line insert a 0 after the decimal point. This does not change the number. Now use the 2 left over from 18 ÷ 4 to make 20.
20 ÷ 4 = 5

So, 98 ÷ 4 = 24.5

Long Division

Long division is a method that helps you divide by numbers more than 10. You write the calculation down in the same way as short division, then instead of calculating remainders in your head and "carrying them over", you work them out on paper and "bring down" digits.

550 ÷ 15

```
      3 6  r 10
15 | 5 5 0
   -1 5 0     (10 x 15)
     4 0 0
    -3 0 0     (20 x 15)
     1 0 0
      - 3 0    (2 x 15)
        7 0
      - 6 0    (4 x 15)
        1 0
```

Count the amount of times you have multiplied 15. In this example that is 36.

10 is the remainder.

So, 550 ÷ 15 = 36 r 10

Dividing decimals

You can use both long and short division to divide decimals too.

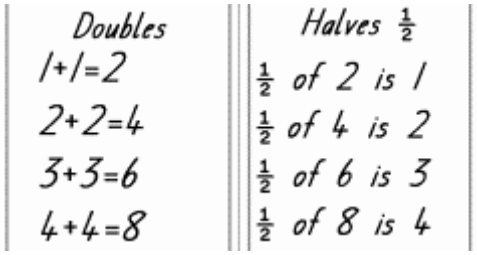
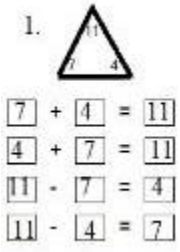
9.3 ÷ 3

```
  3 . 1
3 | 9 . 3
```

9 ÷ 3 = 3
0.3 ÷ 3 = 0.1

Write the decimal point in the answer above the decimal point in the question.

Number Relationships

Addition and Subtraction	
Learn and remember doubles and halves.	
Explore fact families. **Use this knowledge to answer addition and subtraction sums.**	
Split up a two digit number into tens and ones (units)	23 = 20 + 3