Connected Learning- Powers Hall Academy
Key Facts policy

x	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

The following pages show the progression for the teaching and learning of key number facts, including multiplication and division facts and addition and subtraction facts throughout school. It shows progression and expectation and sets out the school approach and how this works in line with the National Curriculum. The focus is on the learning and the application of key facts.

Year 1/ Year 2 – 1x 2x 5x and 10x tables

If you know 1x and 10x table, there are only **20 facts to learn**.

If you know all of these, then there are only another **36 facts to learn:**

Year 3 – 26 facts Year 4 – 10 facts

Pupils should learn the multiplication tables in the 'families' described in the progression table below – making connections between the multiplication tables in each family will enable pupils to develop automatic recall more easily, and provide a deeper understanding of multiplication and division.

YEAR 1 / YEAR 2

1x table	2x table	5x table	10x table
1 x 1	2 x 2	3 x 5	3 x 10
2 x 1	3 x 3	4 x 5	4 x 10
3 x 1	4 x 2	5 x 5	6 x 10
4 x 1	5 x 2	6 x 5	7 x 10
5 x 1	6 x 2	7 x 5	8 x 10
6 x 1	7 x 2	8 x 5	9 x 10
7 x 1	8 x 2	9 x 5	10 x 10
8 x 1	9 x 2	10 x 5	11 x 10
9 x 1	10 x 2	11 x 5	12 x 10
10 x 1	11 x 2	12 x 5	
11 x 1	12 x 2		
12 x 1			
12 FACTS	11 FACTS	10 FACTS	9 FACTS

PROFESSIONAL DEVELOPMENT SPINE DOCUMENTS

2.3 Times tables: groups of 2 and commutativity (part 1)

Teaching point 1: For equally grouped objects, the number of groups is a factor, the group size is a factor, and the overall number of objects is the product; this can be represented with a multiplication equation. Counting in multiples of two can be used to find the product when the group size is two.
Teaching point 2: Counting in multiples of two can be represented by the two times table. Adjacent multiples of two have a difference of two. Facts from the two times table can be used to solve problems about groups of two.
Teaching point 3: Factor pairs can be written in either order, with the product remaining the same (commutativity).

2.4 Times tables: groups of 10 and of 5, and factors of 0 and 1

Teaching point 1: Counting in multiples of ten can be represented by the ten times table. Adjacent multiples of ten have a difference of ten. Facts from the ten times table can be used to solve problems about groups of ten.
Teaching point 2: Counting in multiples of five can be represented by the five times table. Adjacent multiples of five have a difference of five. Facts from the five times table can be used to solve problems about groups of five.
Teaching point 3: Skip counting and grouping can be used to explore the relationship between the five times table and the ten times table.
Teaching point 4: When zero is a factor, the product is zero. When one is a factor, the product is equal to the other factor (if there are only two factors).

YEAR 3

3x table	6 x table	9 x table	4 x table
3 x 3	4 X 6	4 x 9	4 x 4
4 x 3	6 x 6	7x 9	7 x 4
6 x 3	7 x 6	8 x 9	8 x 4
7 x 3	8 x 6	9 x 9	11 x 4
8 x 3	9 x 6	11 x 9	12 x 4
9 x 3	11 x 6	12 x 9	
11 x 3	12 x 6		
12 x 3			
8 FACTS	7 FACTS	6 FACTS	5 FACTS

2.7 Times tables: 2, 4 and 8, and the relationship between them

Teaching point 1: Counting in multiples of four can be represented by the four times table. Adjacent multiples of four have a difference of four. Facts from the four times table can be used to solve multiplication and division problems with different structures.
Teaching point 2: Products in the four times table are double the products in the two times table; products in the two times table are half of the products in the four times table.

2.8 Times tables: 3, 6 and 9, and the relationship between them

Teaching point 1: Counting in multiples of three can be represented by the three times table. Adjacent multiples of three have a difference of three. Facts from the three times table can be used to solve multiplication and division problems with different structures.
Teaching point 2: Counting in multiples of six can be represented by the six times table. Adjacent multiples of six have a difference of six. Facts from the six times table can be used to solve multiplication and division problems with different structures.
Teaching point 3: Products in the six times table are double the products in the three times table; products in the three times table are half of the products in the six times table.
Teaching point 4: Counting in multiples of nine can be represented by the nine times table. Adjacent multiples of nine have a difference of nine. Facts from the nine times table can be used to solve multiplication and division problems with different structures.
Teaching point 5: Products in the nine times table are triple the products in the three times table. Products that are in the three, six and nine times tables share the same factors.
Teaching point 6: Divisibility rules can be used to find out whether a given number is divisible (to give a whole number) by three, six or nine.

YEAR 4				
8x table	7x table	11x table	12x table	
7 x 8 8 x 8 11 x 8 12 x 8 4 FACTS	7 x 7 11 x 7 12 x 7 3 FACTS	11 x 11 12 x 11 2 FACTS	12 x 12 1 FACT	2.7 Times tables: 2, 4 and 8, and the relationship between them **Teaching point 3** Counting in multiples of eight can be represented by the eight times table. Adjacent multiples of eight have a difference of eight. Facts from the eight times table can be used to solve multiplication and division problems with different structures. **Teaching point 4**: Products in the eight times table are double the products in the four times table; products in the four times table are half of the products in the eight times table. Products that are in the two, four and eight times tables share the same factors. **Teaching point 5**: Divisibility rules can be used to find out whether a given number is divisible (to give a whole number) by two, four or eight. 2.9 Times tables: 7 and patterns within/across times tables **Teaching point 1**: Counting in multiples of seven can be represented by the seven times table. Adjacent multiples of seven have a difference of seven. Facts from the seven times table can be used to solve multiplication and division problems with different structures. **Teaching point 2**: When both factors are odd numbers, the product is an odd number; when one factor is an odd number and the other is an even number, the product is an even number; when both factors are even numbers, the product is an even number. **Teaching point 3**: When both factors have the same value, the product is called a square number; square numbers can be represented by objects arranged in square arrays. **Teaching point 4**: Divisibility rules can be used to find out whether a given number is divisible (to give a whole number) by particular divisors. 2.11 Times tables: 11 and 12 **Teaching point 1**: The distributive law can be used to build up the 11 times table by partitioning 11 into 10 and 1. Adjacent multiples of 11 have a difference of 11. **Teaching point 2**: The distributive law can be used to build up the 12 times table by partitioning 12 into 10 and 2. Adjacent multiples of 12 have a difference of 12. **Teaching point 3**: Products in the 12 times table are double the products in the six times table; products in the six times table are half of the products in the 12 times table. **Teaching point 4**: Divisibility rules can be used to find out whether a given number is divisible (to give a whole number) by 11 or 12.

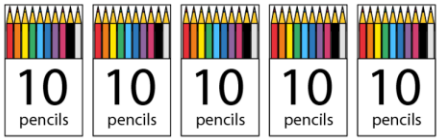
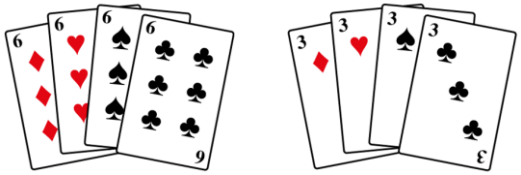
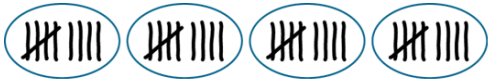
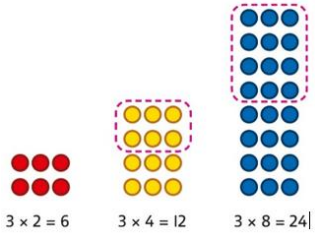
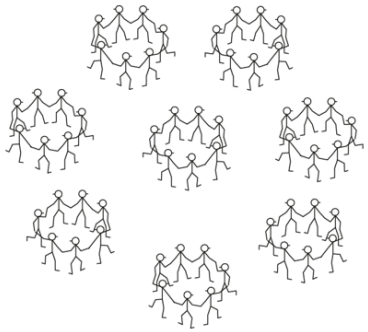
Multiplication and division facts

The full set of multiplication calculations that pupils need to be able to solve by automatic recall are shown in the table below. Pupils must also have automatic recall of the corresponding division facts.

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

Pupils must be fluent in these facts by the end of year 4, and this is assessed in the multiplication tables check. Pupils should continue with regular practice through year 5 to secure and maintain fluency. The 36 most important facts are highlighted in the table. Fluency in these facts should be prioritised because, when coupled with an understanding of commutativity and fluency in the formal written method for multiplication, they enable pupils to multiply any pair of numbers.

Factual fluency progression Termly Planner 1

	AUTUMN	SPRING	SUMMER	OFFER VARIETY OVER TIME TO FULLY CONSOLIDATE EACH TIMES TABLE
YEAR 3	**Ensure 2x 5x and 10x <u>with understanding</u>** Develop an understanding of how to unitise groups of 2, 5 and 10 and learn corresponding times-table facts. Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts.   **Any size number x2** **Any size number x10** **Any size number x5 (as half of 10x)** **Number Sense: doubles/pairs** **Play: Build 10, and halve for 5** **Explore: Doubling and Halving then 3x**	**If I know…** **3x⇒6x** Understand links between the ×3 table, ×6 table and ×9 table *5 × 6 is double 5 × 3*  **then 9x**  **Number Sense: '3-ness'** **Play: Build 3 then double for 6** **Explore: Root digits of 3x, 6x, 9x**	**If I know…** **2x⇒4x⇒8x** Children understand how the ×2, ×4 and ×8 tables are related through repeated doubling.  **x 10, x100** **÷ 10, ÷ 100** Explore the relationship between known times-tables and multiples of 10 using place value equipment. **Number Sense: '4-ness' and '8-ness'** **Play: Build 2, then double, then double** **Build 8, then halve, then halve** **Explore: Associative and Distributive Law**	**1. <u>Models and Images</u>** **Fingers**  **Building arrays** • **Cubes** • **Counters** **Counting stick** **Number lines** **Drawing squares in a grid** ……. **1. <u>Choral Counting</u>** **Forwards and Backwards** **Say the solutions** **Teacher says "One times 3"** **Learners say "3"** ……. **2. <u>RECALL</u>** **In order** **Count on from …** **Count back from…** **Any order**
YEAR 4	**Ensure fluency 3x 4x 6x 8x then 7x**  **Play: Partition 7 as 5+2 or 3+4 and use these facts to calculate** **Explore: links to 6x and 8x facts**	**Fluency 'any' x 11x 12x** Represent the ×11 table and ×12 tables in relation to the ×10 table.  *2 × 11 = 20 + 2* *3 × 11 = 30 + 3* *4 × 11 = 40 + 4*  **Play: Use what's known to derive new facts** **Explore: On a 10 x 10 multiplication grid-which facts need just memorisation?**	***Prep for Year 5 x/÷ rapid facts*** Understand the special cases of multiplying by 1 and 0.  *5 × 1 = 5* *5 × 0 = 0* Understand how times-tables relate to counting patterns. ×5 table and ×6 table *I know that 7 × 5 = 35* *so I know that 7 × 6 = 35 + 7.* ×5 table and ×7 table *3 × 7 = 3 × 5 + 3 × 2* ×9 table and ×10 table *6 × 10 = 60* *6 × 9 = 60 − 6* ***Notice: Speedy Calculation*** By the end of Year 4, children are expected to know ALL of their times tables	

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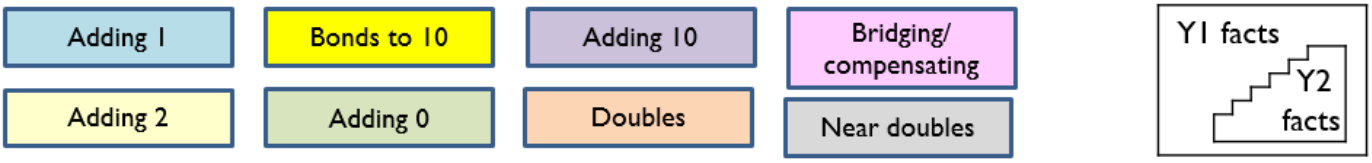
Addition and subtraction facts

The full set of addition calculations that pupils need to be able to solve with automaticity are shown in the table below. Pupils must also be able to solve the corresponding subtraction calculations with automaticity.



+	0	1	2	3	4	5	6	7	8	9	10
0	0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1	1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	1 + 10
2	2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8	2 + 9	2 + 10
3	3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7	3 + 8	3 + 9	3 + 10
4	4 + 0	4 + 1	4 + 2	4 + 3	4 + 4	4 + 5	4 + 6	4 + 7	4 + 8	4 + 9	4 + 10
5	5 + 0	5 + 1	5 + 2	5 + 3	5 + 4	5 + 5	5 + 6	5 + 7	5 + 8	5 + 9	5 + 10
6	6 + 0	6 + 1	6 + 2	6 + 3	6 + 4	6 + 5	6 + 6	6 + 7	6 + 8	6 + 9	6 + 10
7	7 + 0	7 + 1	7 + 2	7 + 3	7 + 4	7 + 5	7 + 6	7 + 7	7 + 8	7 + 9	7 + 10
8	8 + 0	8 + 1	8 + 2	8 + 3	8 + 4	8 + 5	8 + 6	8 + 7	8 + 8	8 + 9	8 + 10
9	9 + 0	9 + 1	9 + 2	9 + 3	9 + 4	9 + 5	9 + 6	9 + 7	9 + 8	9 + 9	9 + 10
10	10 + 0	10 + 1	10 + 2	10 + 3	10 + 4	10 + 5	10 + 6	10 + 7	10 + 8	10 + 9	10 + 10

Pupils must be fluent in these facts by the end of year 2, and should continue with regular practice through year 3 to secure and maintain fluency. It is essential that pupils have automatic recall of these facts before they learn the formal written methods of columnar addition and subtraction.

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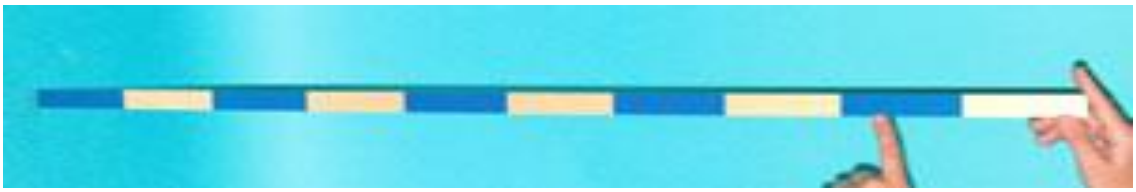
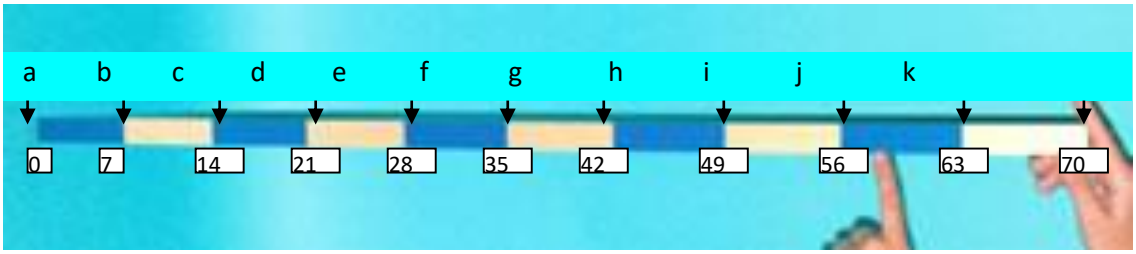
	Year 1	Year 2	Year 3	Year 4	Year 5
Autumn 1	Recall addition facts within 10 with growing fluency. Adding 1 Adding 1 (e.g. 7 + 1 *and* 1 + 7) Doubles Doubles of numbers to 5 (e.g. 4 + 4) Adding 2 Adding 2 (e.g. 4 + 2 *and* 2 + 4)	Consolidate addition and subtraction facts within 10 with automaticity Recall addition facts across 10 with growing fluency. Doubles Doubles of numbers to 10 (e.g. 7 + 7) Consolidate counting in steps of 2, 5 and 10 in order from 0 up to 12x.	**Consolidate addition and subtraction facts within and across 10 with automaticity.** Consolidate counting in steps of 2, 5 and 10 in order from 0 up to 12x. Count in multiples of 3 to 12x3 in order from 0 fluently.	Recall multiples of 3,6, 9 and 4 up to 12x in any order, including missing numbers and related division facts fluently. Count in multiples of 8 (relating to x4) to 12x8 in order from 0 with growing fluency.	**The National Curriculum expectation is that by the end of Year 4, children are able to recall all 12 tables up to 12x12.** **To secure this, we recommended that the first/second term of Year 5 be used to consolidate by continuing your practice. If you find that your children are working below the structure outlined in this document, we recommend tracking back to where your children are**. Recall multiples of 12 in any order, including missing numbers and related division facts fluently. Recall multiples of all times tables up to 12x12 in any order, including missing numbers and related division facts with growing fluency.
Autumn 2	Count in 2's up to 24, linking with even numbers and supporting doubles. Count in multiples of 10 in order up to 120.	Recall addition facts across 10 with growing fluency. Near doubles Near doubles (e.g. 5 + 6 *and* 6 +5) Count in steps of 2 and 5 from 0 up to 12x fluently. Recall multiples of 10 up to 12x10 in any order, including missing numbers and related division facts with growing fluency.	Recall multiples of 3 up to 12x3 in any order, including missing numbers and related division facts with growing fluency. Count in 6's in order up to 12x6, using multiples of 3 to support.	Recall multiples of 8 up to 12x4 in any order, including missing numbers and related division facts with growing fluency. Fluently count in 7's in order up to 12x7.	
Spring 1	**Recall addition facts, including corresponding subtraction calculations within 10 with growing fluency.** Bonds to 10 Number bonds to 10 (e.g. 8 + 2 *and* 2 + 8) Adding 10 Adding 10 to a number (e.g. 5 + 10 *and* 10 + 5) Focus on counting in multiples of 5 up to 60, linking with knowledge of counting in 10s.	Recall multiples of 2 up to 12x2 in any order, including missing numbers and related division facts. Recall multiples of 10 up to 12x10 fluently. Recall addition facts, including corresponding subtraction calculations across 10 with growing fluency. Bridging/ compensating Bridging (e.g. 8 + 4 *and* 4 + 8) Compensating	Recall multiples of 3 up to 12x3 in any order, including missing numbers and related division facts fluently. Count in multiples of 6 to 12x6 in order from 0 with fluency.	Recall multiples of 8 up to 12x8 in any order, including missing numbers and related division facts fluently. Recall multiples of 7 in any order, including missing numbers and related division facts with growing fluency.	
Spring 2	Continue to develop fluency of counting in 2's and 10's.	Recall multiples of 5 up to 12x5 in any order, including missing numbers and related division facts. Recall multiples of 2 up to 12x2 in any order, including missing numbers and related division facts with growing fluency.	Recall multiples of 6 up to 12x6 in any order, including missing numbers and related division facts with growing fluency. Fluently count in 9's in order up to 12x9.	Recall multiples of 7 in any order, including missing numbers and related division facts fluently. Fluently count in 11's in order up to 12x11.	Secure and maintain fluency in all multiplication tables, and corresponding division facts, through continued practice.
Summer 1	**Recall addition facts, including corresponding subtraction calculations within 10 fluently.** Adding 0 Adding 0 to a number (e.g. 3 + 0 *and* 0 + 3) Near doubles Near doubles (e.g. 3 + 4 *and* 4 + 3) Count in multiples of 10, 2 and 5 in order with growing fluency.	Recall multiples of 2 up to 12x2 in any order, including missing numbers and related division facts fluently. Recall multiples of 5 up to 12x5 in any order, including missing numbers and related division facts with growing fluency. Recall addition facts, including corresponding subtraction calculations across 10 fluently. Bridging/ compensating Bridging (e.g. 8 + 4 *and* 4 + 8) Compensating	Recall multiples of 6 in any order, including missing numbers and related division facts fluently. Count in multiples of 4 to 12x4 in order from 0 with growing fluency. Recall multiples of 9 in any order, including missing numbers and related division facts with growing fluency (using 10x and adjusting by 1 group to find 9x as a strategy)	Recall multiples of 11 in any order, including missing numbers and related division facts fluently. Fluently count in 12's in order up to 12x12.	
Summer 2	**Recall addition facts, including corresponding subtraction calculations within 10 with automaticity.** No Family The ones without a family! 5 + 3, 3 + 5, 6 + 3, 3 + 6 Count in multiples of 10, 2 and 5 in order fluently.	Recall multiples of 5 up to 12x5 in any order, including missing numbers and related division facts fluently. Recall addition facts, including corresponding subtraction calculations across 10 with automaticity.	Recall multiples of 4 up to 12x4 in any order, including missing numbers and related division facts fluently. Recall multiples of 9 in any order, including missing numbers and related division facts fluently.	Recall multiples of 12 in any order, including missing numbers and related division facts with growing fluency (using 10x and adjusting by adding 2 more groups).	
Teaching	Count pairs of objects Count straws bundled in tens Sing counting songs Hundred square Number lines Pictorial representations on display Rolling Numbers	Counting objects in groups of 2, 5, 10 & 3 Sing counting songs Hundred square Number lines Array with concrete resources Pictorial representations Rolling Numbers	Counting objects in groups of 3, 6, 9 and 4 Hundred square Number lines Array with concrete resources Pictorial representations on display Rolling Numbers	Hundred square Number lines Pictorial representations on display Rolling Numbers	Pictorial representations on display Rolling Numbers

Learning times tables using the counting stick method!



The teacher begins by holding a counting stick. You may already have one in the school, if not you should get it from most educational supplies companies. You will also need small cards with the answers to the times tables written on.

The teacher tells the children they will be magically learning their seven times tables. This gives the children a sense of anticipation about using the method. The teacher asks children a number of questions whose answers relate to the seven times tables. All children answer the teacher together.



1. **What number do we always start with? (while pointing to the start of the counting stick- a)**
   The teacher tells the children that we always start with 0. The teacher places a small card with 0 at the start of the counting stick (using blu tack).

2. **What times table are we learning? (while pointing at interval b on the counting stick)**
   The children should be aware of the times table they are learning. They answer seven. The teacher sticks a seven card at the next interval on the counting stick.

At this point the teacher will repeat step 1 and 2.

3. **Can you multiply it by 10? (pointing to interval k)**
   The children should answer 70. The 70 card is placed at the end of the counting stick.

The teacher repeats step 1 and 2.

4. **Can you double it? (pointing to interval c)**
   The children answer 14. The teacher sticks the 14 card at c.

5. **Can you double that? (pointing to interval e)**
   The children answer 28. The teacher sticks the 28 card at e.

The teacher then revisits steps 1-5 in the same order offering lots of praise for the children as they remember each part.

6. **I have a very special number to tell you and it is called the key. Our key in this times table is 21. (while pointing to d) What is our key?**
   The children answer 21. The teacher sticks the 21 card at d.

7. **Can anybody double the key? (while pointing to g)**
   A child/ some children may answer with 42. The teacher sticks the 42 card at g.

8. **This is really hard now, can anybody triple the key? (pointing to interval j)**
   Again a child/ some children may answer with 63. Show the children that the area along the counting stick has doubled for 42 and tripled for 63.

The teacher then repeats all steps 1-8. Again praising as they go.

9. **Who remembers our key?** Allow children to answer. **Double it.** Children answer. **Now add seven. (pointing to h)**
   The teacher sticks the 49 card at h.

At this stage it is important to repeat all steps after each new number is added to the stick, starting from step 1. Especially when the children are first getting used to the method.

10. **Everybody touch your nose. That's 35. Touch your nose.** Children answer 35. **(point to f- the middle of the counting stick)** The teacher sticks the 35 card at f.

11. **Now everybody needs to help me. There is one number I always forget. Its 56 (pointing to i) What number do I always forget?**
    The children answer 56. The teacher sticks the 56 card at i.

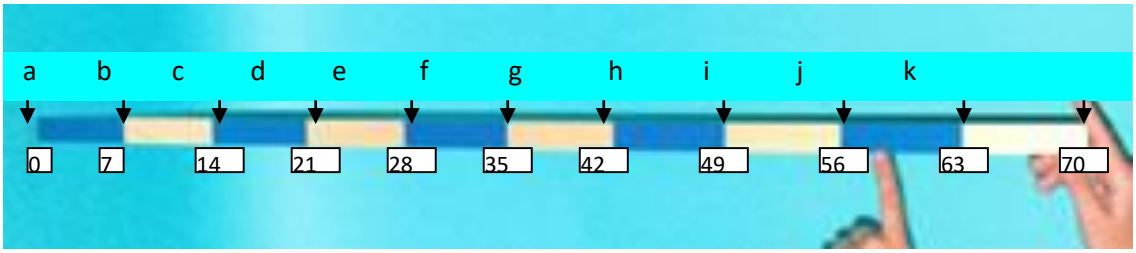
Repeat all questions again pointing to the appropriate answer each time. Although this seems lengthy in words it should only take about seven or eight minutes to complete this far.

The teacher then completes the method again (starting at step 1) however each time the children answer a question, the answer card is removed from the stick! It sounds difficult but it is amazing to see the children can still answer this question. It is important the teacher still points to the correct interval on the stick as it acts as a visual reminder for many children. It is also important the teacher frequently begins at step 1 and works all the way through as many answers lead to the next in this method. When all answers have been removed, work through the method from step 1 to step 11 again, with no numbers on the stick, just pointing to the correct interval.

Things to remember and try:

- This method works so well due to its repetitive nature. Repeat from step 1 after every couple of new answers have been added to the stick. Children rely on the information in the previous step.
- This method and the questions work for all times tables, not just the sevens. Each times table will have a key that can be doubled and tripled.
- Practice the method yourself before using it with the children, try it on a friend or colleague. It is important you are pointing to the correct places on the counting stick when you ask the questions. If it helps, use small stickers showing the answers on the back of the stick.
- Working through the method, putting on the answers and then removing them should only take about 12 mins in total. It is a great mental oral starter to any maths lesson. As a plenary (about 20 minutes later) I would suggest revisiting it with the children, without the answers displayed! I would also suggest using it about three times in one week before moving onto the next times table.
- Children can be challenged in different ways such as to try it with their eyes closed, or turned away from the teacher if really confident. I have also challenged boys against girls etc.

KQ: *What number do we always start with?*
KQ: *What times tables are we doing?*
KQ: *Can you multiply it by 10?*
KQ: *What times table are we doing?*
KQ: *Can you double it?*
KQ: *Can you double that?*
KQ: *What is our key?*
KQ: *Can you double our key?*
KQ: *Can you triple our key?*
KQ: *What is our key?*
KQ: *Can you double our key?*
KQ: *Now can you add seven?*
KQ: *Remember to touch your nose, this is 35.*
KQ: *What number do I always forget?*



Using a counting stick

The Maths to Share article in **Issue 28** focused on using number lines and hundred squares. Towards the end of this article, the counting stick was mentioned.

The counting stick is a resource we will be exploring in this article. It is worthwhile remembering that it can be considered as part of a continuous or 'empty number line' with clearly marked intervals along the stick to represents specific points.

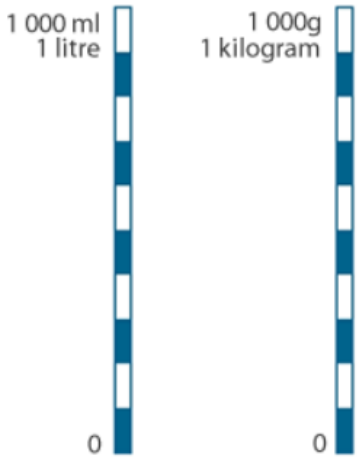
While this is indeed true, it is easy to forget the versatility of the counting stick. It is more flexible than the hundred square and most number lines. The counting stick was first introduced to many at the start of the National Numeracy Strategy. It was one of a suite of models and images suggested for counting on and back in ones and tens and for ordering numbers to 100. However, as time went on, teachers quickly realised how versatile the counting stick was and began to use it to support children's learning in other areas of mathematics. Many of the ideas for using a counting stick could just as easily be utilised with a bead string. Using a range of models and images will help children to make links and generalise their understanding.

You could begin a staff meeting on using the counting stick by asking colleagues when they last used one and what for. In many cases, it will not have been used for some time. If you ask why, the chances are that colleagues have simply got out of the habit.

You might like to watch the Teachers TV programme **Numbers**, part of the Great Primary Lesson Ideas series. The last section from 10:22 to 13:45 is about the counting stick and demonstrates using it for times tables. Notice that the teacher uses the beginning of the stick as 1, not zero, so the times table continues to the eleventh multiple.

During the staff meeting, you will be able to remind colleagues just how useful the counting stick is by sharing with them some of the following uses. Choose the ones relevant to your setting. Make sure you have collected some counting sticks so that participants can have a go, ideally in pairs. It might be worth reminding them that it can be held vertically as well as horizontally.

- tell the children the size of the step and practice counting forwards and backwards. Initially, make the start zero. This is particularly useful for times tables, and you might like to make sets of multiples cards to attach to the stick. Remember to make the link to division too e.g. how many threes are there in 27? How do you know? How could we write that? The beginning of the stick could be any number. Move on to statements like: If this is 20 and we are counting in twos, what number is this...and this...and this as you point to various parts of the counting stick. Count in patterns such as 3, 8, 13, 18, 23, 28... and ask the children what they notice.
- for number sequences, point to the centre of the stick and ask questions such as, if this is 36, what are the numbers either side? What are the numbers at the beginning and end of the stick? What else could they be? Children can specify any value for the numbers, provided they can justify their answers. So for the number stick with 36 in the middle, the numbers either side could be 26 and 46, with the ends – 4 and 86. But the numbers either side could have several other values. Children may find this easier with mini whiteboards to jot on initially.
- for fractions, decimals and percentages initially identify the beginning of the stick as zero, the end as 1 (or 100). Again ask what decimal number (or fraction) is this...and this...and this. Switch between representations – for example if this is 20%, what fraction is that? Move on to identify the beginning of the stick as 1.5 and the end as 1.6, or the beginning as ½ and the end as 1 and again ask what number (or fraction) is this...and this...and this or, where is 1.59? Where is 12/20 etc?
- for measures, hold the counting stick vertically. If the bottom is zero and the top is 1 litre (1 000ml), how many millilitres is this...and this...? How many millilitres to fill to the top? Where would 730 ml be? Use as a spring balance showing weight – this time the bottom is 0g, the top is 1 000g or 1 Kg. How many grams is this...and this...? Where would 270g be? Do the same for length. Use the stick to convert between grams and kilograms, millilitres and litres, centimetres and metres. Do the same for temperature. If this is 0, where is...? Specify Centigrade or Fahrenheit for a real challenge. For time, set a start time at the beginning of the stick and specify the time interval of each block. So if the beginning of the stick is 10 o'clock, where is ten past 11? Use digital time too.



- once the children are confident with any of the activities above, start to use the in-between points to extend understanding. For example, if the counting stick is being used for the 9 times tables, where would 5, 50 or 62 be?
- you could also make individual counting sticks. On A4 landscape paper, draw a table ten columns across, with only one row. Make the row as deep as you want, then colour fill with black alternate cells. Mark what will be the first block with a circle, triangle or other mark of your choice. There is no point using colour unless you can colour photocopy your original. Copy three or four 'tables' onto the page. Print, enlarge to A3 and laminate. Give children a paperclip as a marker and ask them to place the marker where different numbers would go.
- the next step is to convert a PE hoop into a circular counting stick/number line. You can use number cards to label the circle, but an unlabelled one is far more versatile. If you are going to use the circular hoop as a number dial with ten intervals, do not use the same representation with 12 intervals as a clock since this will confuse many children.

Ways to use the Counting Stick

The counting stick is a very versatile tool for teaching maths to primary aged children. Whilst sometimes seen as a tool for teaching foundation and KS1 children, it still has many uses when teaching both lower and upper key stage 2 classes. I've included here a number of techniques that can be used across different types of numbers including decimals, fractions, percentages and negative numbers.

Counting forwards and backwards

The stick can be used simply to count forwards and backwards along the stick. Forward counting should be from left to right as the pupils are looking at it. This will be from the right hand side as the teacher holds the stick in front of him/her. You can split the stick in half to demonstrate where zero sits and then count down and up to include negative numbers. This technique is also useful for times tables and sticky notes can be placed on the stick to assist initially. They can then be removed as and when the children are comfortable with them.

Varying the pace

The teacher can change the pace at which the pupils count. If the counting task is challenging, slow counting will provide additional thinking time. The teacher can introduce a pause and continue counting or a position on the stick can be indicated by a marker (e.g. a piece of ribbon/string, elastic band, roll of sellotape) so that the pupils will know in advance where the pause or rest will happen and then count on to the end of the stick.

The hush stick

The 'Hush' stick combines counting aloud with counting silently. At the 'hush' number pupils continue counting but don't say the hush number aloud

e.g. counting in 10's

10, 20, 30, 40, hush, 60, 70, 80, hush, 100

The 'hush' can be indicated in a number of ways:

- by using a marker to indicate the 'hush' position.
- if using the stick as a number strip then touch the section with one finger instead of grabbing the whole section.
- if using the stick as a number line then indicate a 'hush' position by touching the underside of the stick.

The boomerang stick

Put a marker at a position along the stick. Count up to the marker and back to the start again. This is useful when beginning to work on counting backwards.

The hiccup stick

The 'Hiccup Stick' combines counting forward and backwards. Counting takes place as usual until a 'hiccup' sound is heard. On the hiccup you count back to the previous number and then count on

e.g. counting in 2's

2, 4, 6, 8, 10, hiccup, 8, 10, 12, etc.

Using whiteboards for responses

Instead of all pupils counting in unison tell the pupils the starting number and the interval for counting on and ask them to write on their whiteboards the number shown at the marker. The whiteboards can be replaced by "show me" cards based on teachers preference/age of the children.

A variation is to divide the class into two groups;

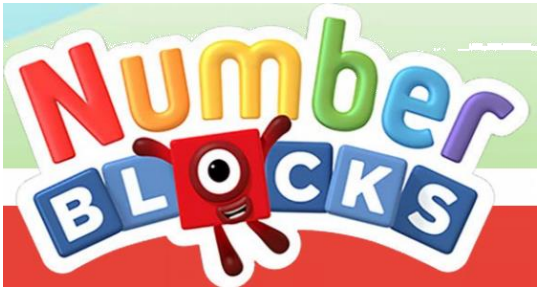
- Group A supplies the number that comes just before the position marked.
- Group B shows the number which comes just after the position marked.

Sometime you can allow pupils to choose the starting number and/or the interval in which to count on instead of the teacher always directing the activity.

So don't leave those counting sticks in the PPA room or at the back of the classroom collecting dust. They are really versatile teaching tools and, as you can see, can be used to engage the children and develop their mathematical thinking.

National Centre for Excellence in the Teaching of Mathematics

Numberblocks: materials to support early number fluency in KS1



Snappy animation and loveable characters combine with engaging storylines to gently introduce concepts of number to support early mathematical understanding.

Teachers are to use the materials for each episode as a launch pad. They are designed to assist Early Years (and also Year 1) practitioners to confidently move on from an episode, helping children to bring the numbers and ideas to life in the world around them.

The materials are designed to be used in conjunction with the *Numberblocks* episodes. They highlight and develop the key mathematical ideas that are embedded in the programmes.

https://www.bbc.co.uk/iplayer/group/b08bzfnh

Series One Overview

Series	Episode title	Episode summary	Mathematics
1	**One**	A little block falls out of the sky, meets her numberling and discovers one wonderful world, singing and counting to one.	Meet One • Counting to 1
	Another one	One discovers it's tricky to play tennis when you're the only block in the world. She bumps into a magic mirror and meets Another One − and they join forces to make Two.	Meet Two • 2 is one more than 1
	Two	Two finds a pair of magic dancing shoes and shows One that everything is better with 2, singing and counting things that belong in pairs	Counting to 2 • The 'twoness' of 2
	Three	Three arrives with a bang − and a song and-dance about her favourite number: 1, 2, 3, Everybody Look at Me!	Meet Three • 3 is one more than 2
	One, Two, Three!	Three does magic tricks with apples to show the others who goes first, who's biggest and how to surprise your number friends.	Counting to 3 • Comparing numbers 1,2 and 3 – 'bigger' and 'smaller' • Ordering numbers 1 to 3 • 3 is made of 2 and 1
	Four	Four is the new block on the block and he can't wait to share how much he loves to be square!	Meet Four • 4 is one more than 3 • Counting to 4 • The structure of 4 as a square number • Recognition of 4 items without counting (subitising)
	Five	Five arrives to get the band together − and gets the party started − with a big high five!	Meet Five • 5 is one more than 4 • Counting to 5 • Line up 1 to 5 in order
	Three Little Pigs	The Numberblocks present their very own, very numbery version of the classic tale: The Three Little Pigs and the Big Bad Square	Counting to 4 • Adding 1s
	Off We Go!	Five and friends set off on a rhyming romp through field and forest but they keep getting mixed up!	Counting to 5 • Line up 1 to 5 in order • Identify missing numbers within a 1 to 5 line-up
	How to count	It's a lovely day for a picnic but one of the flapjacks is missing! Is there a flapjack-snaffler on the loose or has Three forgotten what Numberblocks do best?	The key principles of counting: • One-to-one correspondence – match one number name to each item to be counted • Cardinality – the last number in the count is the total size of the group • Stable order- say the number names in the correct order
	Stampolines	Three opens a stampoline park, where her friends have splatty fun making inky prints of all the shapes they can make.	Subitising numbers 1 to 5 • Different ways of arranging blocks to 5 • Conservation of number – different arrangement of blocks but the number remains the same
	The Whole of Me	The Numberblocks show us what they are made of in a song and dance all about the parts that make a whole.	Composition of numbers 1 to 5 • Introduction to the 'part-part-whole' structure of number • Partitioning a whole number into parts • Conservation of number – a number can be partitioned but the whole (total) remains the same
	The Terrible Twos	Double trouble as Four splits and a pair of tricky twins turn up: The Terrible Twos, who decide it's time to tickle their friends to pieces.	4 can be partitioned into 2 and 2; and, 1 and 1 and 1 and 1.
	Holes	Five and friends discover a hole that makes their heads fall off!	The number of a group can be changed by adding to it or taking from it. Addition and subtraction of 1 Number bonds to 5
	Hide and Seek	Five is so good at hide and seek, she can find the others without looking up from her book − but how?	Addition and subtraction of numbers to 5 Number bonds to 5

Series Two Overview

Series	Episode title	Episode summary	Mathematics
2	**Six**	The Numberblocks make a new friend who likes to roll the dice, and with Six in the mix, everything's a game.	Meet Six • Counting (1 to 6) • Subitising (dice patterns)
	Seven	It's a rainy day for a picnic, but when lucky number Seven appears, everything comes up rainbows.	Meet Seven • 7 is one more than 6 • Counting (1 to 7)
	Eight	Numberland is rocked by the arrival of superblock Eight, known to his friends and fans as Octoblock.	Meet Eight • Counting (1 to 8) • 8 is one more than 7 • Subitising (8)
	Nine	Numberblock Nine arrives in Numberland, finds a friend in Four, sings a song about squares… and sneezes!	Meet Nine • Counting (1 to 9) • The structure of square numbers (4 and 9) • Partitioning and combining 9
	Ten	Ten comes to town and tells the team what it's like to be a perfect ten-block, singing I'm Ten Ones and I'm One Ten.	Meet Ten • Counting (1 to 10) • 10 ones are equivalent to one 10
	Just Add One	One's idea of fun is singing, dancing and making friends by adding one!	Adding 1 • Counting (1 to 10)
	Ten Green Bottles	One of the bottles in Ten's collection accidentally falls off the wall and sparks a very numbery hullabaloo.	Subtracting 1 • Counting (1 to 10) • Counting down 10 to 1
	Counting Sheep	Six tries to get the cheeky sheep to sleep and discovers that two (or three) heads are better than one.	Exploring equivalent ways to represent 6 • Partitioning 6 into equal groups • Factors of 6
	Double Trouble	One explores the Double Dungeon of Doom in search of the golden apples and doubles all the way up to Octoblock.	Doubling (1, 2, 4, 8) and halving • Partitioning 8 into equal groups
	The Three Threes	When Nine needs a helping hand, he turns into a talented trio of bouncing blocks, the three Threes	Partitioning 9 into 3 equal groups • Partitioning is the inverse of combining
	Odds and Evens	The Numberblocks play an exciting game of bounceball − it's the Even Tops versus the Odd Blocks.	Odd and even numbers • Equal groups
	Fluffies	One finds a friendly furball, two of them tickle Two and soon Numberland is full of fun and fluffies!	Counting (1 to 8) • Number bonds within 7
	Blast Off!	Ten promises to take the others on a trip to the moon but blasts off on her own. How will they get there?	Count back from 10 to 1 • Number bonds that total 10
	The Two Tree	The Numberblocks find a magic twotree and play an action-packed game of throwing Twos.	Subtracting 2 from numbers up to 10 • Counting in 2s
	Numberblock Castle	One, Two, Three and Four have a castle-exploring adventure, with a little help from the friends they make along the way.	Adding more than 1 to make 5 to 10

Series Three Overview

Series	Episode title	Episode summary	Mathematics
3	**Once Upon a Time**	Are you sitting comfortably? Then we'll begin a bedtime story all about the first five Numberblocks.	A review of numbers 1 to 5
	Blockzilla	Coming now to a screen near you: the monster tale of a colossal creature who really, really likes bigger numbers	Comparison of numbers 1 to 5 using the language of 'greater than' and 'less than'
	The Numberblocks Express	All aboard for a riotous railway ride as the Numberblocks try to stop a runaway train.	Composition of 5 • Partitioning and combining 5 in different ways
	Fruit Salad	Welcome to the fabulous fun fruit factory, where Three's super fruitsorting machines aren't giving her any fruit.	Composition of numbers to 5 • Exploring the part-part-whole model to partition and combine numbers to 5
	Zero	When there's nothing there to count and none is the amount, nobody does it better than Zero.	Introducing the concept of zero • Zero is one less than 1 and an absence of something
	Now We Are Six to Ten	Are you sitting comfortably? Then we'll begin a bedtime story all about Numberblocks Six to Ten.	A review of numbers 6 to 10
	Numberblobs	Sing along to the Numberblobs counting song with the Numberblocks' favourite friends.	Counting to 10
	Building Blocks	The Numberblocks rescue a friendly alien who helps them build a tower to the stars.	Building with blocks and exploring space and pattern
	Peekaboo!	The number friends take turns hiding behind each other in a song and dance all about bigger and smaller.	Comparison of numbers to 10 using the language of 'bigger than', 'smaller than' leading to 'greater than' and 'less than'
	Hiccups	Every time Numberblock Nine hiccups, he falls to pieces – until the others find an unexpected cure.	Composition of numbers to 10 • Partitioning and combining numbers in different ways
	What's the Difference?	Seven shows the others how to be lucky like him: just ask a number friend to jump on your head! But how do you know which friend?	Comparison of numbers to 10 • Finding the difference to make 7
	Numberblock Rally	Ten riders, ten pedal-powered cars, but only one can lift the trophy. Welcome to the Numberblock Rally!	Subtraction
	Five and Friends	When Five and friends go missing from the five-star ball, Six to Ten discover they are all Five-and-a-friend!	Numbers 6 to 10 are made from 5 and a 'bit'
	Octoblock to the Rescue!	The terribly naughty Terrible Twos are making custard pies and Octoblock is all tied up: can his friends save the day?	Pairs of numbers that total 8
	Ten Again	The number friends all want to do different things today, so rocket Ten finds a clever way to do it all.	Pairs of numbers that total 10
	Flatland	Squarey, we're not in Numberland anymore! Four visits Flatland, where the flat shapes live, and becomes a real square.	2D Shape
	Pattern Palace	One and chums carefully cross the precarious pattern puzzle paths over many magic moats to get to the Pattern Palace.	Pattern
	The Legend of Big Tum	A big hairy monster with a big hairy tummy who loves puzzles? Find out who is in Big Tum's tum!	Problem solving and finding the missing number
	Mirror, Mirror	One makes a wish that the magic mirror could make lots of friends at once − and soon it's pandemonium.	• Adding multiples of the same number
	The Wrong Number	It was a grey day in the big city. One was wondering where her next case would come from, when a square silhouette appeared at the door.…	Problem solving – reasoning about number

Series Four Overview

Series	Episode title	Episode summary	Mathematics
4	**Fifteen' Minute of Fame**	The Numberblocks put on a talent show of terrific number tricks.	Numbers 1 to 15

	On Your Head	When their numberlings fall off, the Numberblocks have to work out who they are.	Place value of number 1 to 15
	Ten's Place	Trainer Ten puts her friends through their paces with a highenergy number workout.	Learn about numbers that are 'ten and a bit'
	Balancing Bridge	It's all in the balance as the Numberblocks try to make it across a very wobbly bridge.	Learn more about numbers that are 'ten and a bit' and adding
	Sixteen	Learn all about the number 16 with Numberblock Sixteen!	Learn all about the number 16; 16 is 10 and 6
	Square Club	Things get out of hand at a Square Club meeting. Can anyone save the day?	The structure of numbers up to 16 that make squares
	Seventeen	Meet the artist known as Seventeen, who likes to paint 17 of everything.	Learn all about the number 17; 17 is 10 and 7
	Eighteen	Meet Eighteen, the super speedy rectangle who was born to ride the rays.	Learn all about the number 18; 18 is 10 and 8
	Loop the Loop	Super rectangle Eighteen shows the others how to ride the rays on the super-duper looper	Learn more about numbers that can make rectangle shapes (arrays)
	Ninteen	New Numberblock Nineteen discovers she is a one-off with a hidden talent.	Learn all about the number 19; 19 is 10 and 9
	Twenty	Numberblock Twenty struts his stuff and dances the Two Tens Tango.	Learn all about the number 20; 20 is two tens
	Tall Stories	It's time for a bedtime story about all Numberblocks Sixteen to Twenty.	Numbers 16 to 20
	Flights of Fancy	Rocket Ten and friends blast off into space for a rhyming adventure	Explore numbers 11 to 20 as ten-and-a-friend
	I can Count to Twenty	The Numberblobs challenge Twenty to a singing count-off.	Counting in steps forward and back
	Heist	Can Sixteen to Twenty sneak past the robot guards at the Museum of Numbers?	Properties of numbers to 20
	Sign of the Times	Super-speedy Eighteen discovers a faster way to add a number together lots of times.	Multiplication as repeated addition
	Fun Time Fair	Twelve helps the Numberblobs work out how many tokens they need for each fairground ride.	Multiplication as repeated addition
	The Lair of Shares	Can One and friends escape the Lair of Shares?	The sharing structure of division
	Terrible Twosday	Who can stop the invasion of the Terrible Twos?	The grouping structure of division
	Divide and Drive	Three invites the other Numberblocks to her super new gokart track.	Division involving the grouping structure
	Twenty One and On	Twenty and chums find out what happens when you go past bus stop 20.	Learn about the numbers 21, 22 and 23
	We're Going on a Square Hunt	The squares explore an ancient temple in search of a really, really big square.	Learn more about square numbers
	Thirty's Big Top	Welcome to the Big Top, where Thirty and friends show off their circus tricks	Learn about the numbers 30, 40 and 50
	Land of the Giants	Five and friends discover a way to make themselves ten times bigger!	Learn how to count, add and think in multiples of 10
	Fifty	Superstar Fifty rocks out the Numberland stadium with her shining gold guitar.	Count in steps of 5
	Sixty's High Score	It's time to meet Sixty and friends in a rocket-powered game of How Many Tens.	Learn about the numbers 60, 70, 80
	The Big One	One has found a way to keep adding Ones all the way to Ninety-nine. What comes next?	Learn to count to 99
	One Hundred	One Hundred shows us what she's made of in a big song about being big.	Introduction to 100
	One Thousand and One	One wonders if anyone could be bigger than One Hundred.	Learn about huge numbers
	More to Explore	It's time for the grand finale but the number fun doesn't stop here.	Numbers are everywhere