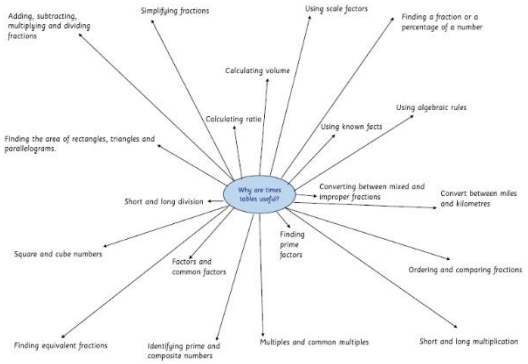
Curriculum Overview: Mathematics – Multiplication Bonds

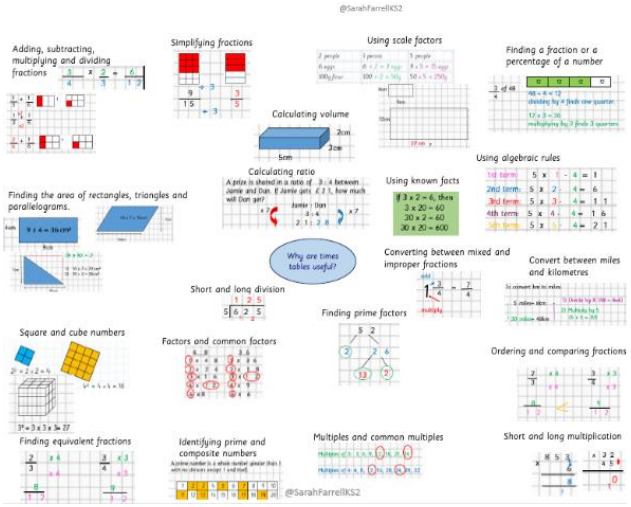
Hethersett Woodside Primary & Nursery

Intent

At Hethersett Woodside we believe that it is important that children are given the opportunity to see, explore, and understand the mathematical structures and patterns of multiplication bonds (times tables) for real deep, embedded learning. We want our children to know their multiplication bonds really well and through developing a deep conceptual understanding alongside the ability to recall, they will be able to apply them confidently, including the inverses.

Multiplication bonds are fundamental to many maths topics (for example, fractions and algebra) and calculation strategies (for example, short multiplication, long multiplication, short division and long division), requiring children to be able to carry them out quickly and with a degree of automaticity. With nearly 60% of GCSE topics being traced to a root in multiplication bonds, we aim to provide solid foundations for their next stage of education. Being fluent in multiplication bonds means that working memory is freed up, which in turn reduces the cognitive load and leaves space to explore new mathematical ideas, reason and solve more complex problems.





Key Subject Knowledge

There are five core structures of multiplication:

- **additive (repeated addition)**
- **multiplication (multiplication bonds)**
- **array (area)**
- **scaling (increasing an amount by a given scale factor)**
- **Cartesian product (finding the number of possible combinations from two or more sets).**

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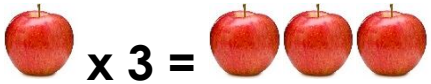
At Woodside we believe that deep understanding of a mathematical concept happens through a CPA approach. Therefore it is essential that we use the correct language when reading and writing multiplication calculations. Whilst there is not the expectation to use this with the children, the correct terminology is:

multiplicand x multiplier = product

As the *multiplicand* refers to a quantity which is multiplied by another, the *multiplier*, we teach multiplication as a quantity (the group size) and the number of times we need it. The below examples represent this:

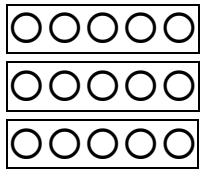
Concrete:



Here one apple is the multiplicand, three is the multiplier and the product is what is produced when we have replicated the one apple three times. Hence, it is verbally expressed as:
'One apple, three times produces three apples.'
or
'The product of one apple, three times is three apples'.

Abstract alongside pictorial:

5 x 3 = 15



Here five is the multiplicand, three is the multiplier and the product is what is produced when we have replicated the five three times. Hence, it is verbally expressed as:
'Five, three times produces fifteen.'
or
'The product of five, three times is fifteen'.

Through the correct use of language, we are preparing our children for more abstract concepts. In particular, the links with algebra where children will be exposed to expressions like 6n, where 6 is the constant and n is the variable.

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Distribution Law

Multiplication is distributive. This means that when multiplying two numbers together the product is the same as if you were multiplying a number by a group of numbers added together. For example,

6 x 3 = (2 + 4) x 3 = (2 x 3) + (4 x 3)

Therefore, multiplication bonds can be derived from related known bonds by partitioning one of the factors (either multiplicand or multiplier) into two parts.

Unitising (taken from https://www.ncetm.org.uk/features/what-is-unitising-and-why-is-it-important/)

Unitising is the ability to treat groups that contain, or represent, the same numbers of things as 'units' or 'ones'. Being able to 'unitise' if fundamental in handling money and in understanding place value. It forms a thread of understanding throughout further development of multiplication and division concepts. It allows children to move from additive to multiplicative thinking. As previously stated, the multiplicand refers to the quantity or 'unit'. The below examples represent this:

Concrete alongside abstract:

6 + 6 + 6 = 6 x 3 = 18

When working out the number of eggs contained in a stack of egg boxes you would not open the boxes and count the individual eggs. Rather you take the box as an entity in its own right with a unit value of 6 and operate with it.

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Implementation

Progression of Teaching

The following table shows which multiplication bonds will be taught per half term. Appendix 1 contains the full list, identifying those facts which will be new to the children, and those which they should already know using the commutative law, i.e. a x b = b x a.

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1.1	*When children are ready, they will be exposed to counting in multiples of 2 and 10.*	Doubling	5x	4x	7x	Squares 0^2 to 20^2	Cubes 0^3 to 12^3
1.2		1x	3x	8x	9x	25x	75x
2.1		10x	6x	11x	12x	0.25x	0.75x
2.2		2x	5x *Consolidation*	4x *Consolidation*	7x *Consolidation*	Squares *Consolidation*	Cubes *Consolidation*
3.1		10x *Consolidation*	3x *Consolidation*	8x *Consolidation*	12x *Consolidation*	19x	17x
3.2		2x *Consolidation*	6x *Consolidation*	11x *Consolidation*	0x *Consolidation*	19x *Consolidation*	*Consolidation*

For each set of multiplication bonds (Years 1 to 4), children will learn the facts for the multipliers 0 to 12. In Years 5 and 6 children will learn the multiplication facts for the multipliers 0 to 10. This is because we aspire that as children develop fluency with multiplication they will be able to use the distribution law to work out further multipliers, for example 12 x 19 = (10 x 19) + (2 x 19).

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Learning Sequence

Recognising the importance of children being able to efficiently calculate or retrieve their multiplication bonds, we know that children need a combination of direct teaching alongside regular and frequent practice. In each class, a whole half term is devoted to a new multiplication bond. Following a project carried out by the South East London Maths Hub, Jenny Field explained that the reason for focusing on one multiplication table per half term is due to neuro plasticity.

> **…the formation of a new neural pathway takes approximately eight-ten weeks. This time allows for the early formation of a myelin sheath around this pathway which contributes to automaticity – making it a *'go to'* place for recall.**
> https://gala.gre.ac.uk/id/eprint/26932/6/26932%20FIELD_A_Whole_School_Intervention_for_Teaching_Learning_and%20Understanding_Jan%202020.pdf **(read for CPD)**

Within each half term, three lessons are devoted to exploring the new multiplication table – developing connections, exploring patterns and creating a deeper understanding of multiplicative reasoning with specific focus on the new multiplication bonds. As the new table is introduced, class teachers will *systematically build it together* with the children using the bonds that they already know and have met before. Teachers and children will also make clear conceptual links to the real world, creating a half termly display of 'What comes in…' that will be part of their Maths Working Wall. The first two lessons of direct teaching will be allocated at the start of each half term, and the final one will be placed later in the half term, at a time chosen by the class teacher.

Once the new multiplication table has been introduced for the half term, three or more times a week in every class there will be a five- to ten- minute 'retrieval practice' session. During these one or more activities will be used that include conceptual support; full verbal patterning (saying whole calculation) and also step counting, and learning the multiplication facts in order then out of order. Saying the full verbal pattern aloud supports the process of storing facts into our verbal memory. In the above article, Jenny Field stated 'An emphasis on saying (and hearing) the sound pattern of the phrase is important and can lead to verbal prediction and patterning – however this practice can and should include conceptual support.'

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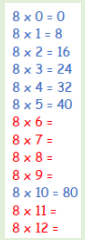
The table below sets out the content of each lesson, as well as ideas for regular practice.

Success Criteria:	**Vocabulary:**	**Key Points to remember:** *e.g. using 6x*
Children will be able to; • Count fluently in groups of … • Use doubling/halving to efficiently calculate unknown facts. • Visualise the array associated with the multiplication facts and will recognise the link with division. • Use the vocabulary: factor, multiple, product, commutative, array, division • Use the word PRODUCT rather than answer.	multiplicand, multiplier, product, factors, multiple, equals, double, halve, share, multiplied by, multiply, equal groups, repeated addition, quantity, commutative, groups of, square, cube, array, row, column	Multiplication facts will be presented as: 6 x 0 = 0 6 x 1 = 6 etc. The first digit is the multiplicand (quantity). Multiplication facts are read as: The product of 6, … times is … or 6, … time produces …

Lesson 1: L.O. We are learning to count in …

Introduce the new multiplication. Link it to the real world. Think, Pair, Share: What comes in groups of …? Create a class poster of their ideas and place on Maths Working Wall. *(This can be added to throughout the half term)*

Display the multiplication bonds without the products. Begin to fill them in using facts children already know, using colour to highlight those known/unknown:



We have learned the 2, 3, 4, 5 and 10 times multiplication bonds. We already have some of the facts for the 8 times tables. What are they?

Which facts are left to learn? Which facts might help us to work them out?
Double/Halve/Add/Subtract

Chant the whole multiplication table: … times 0 produces …, … times 1 produces …, … times 2 produces … etc. *Use the word 'produces' to reinforce and cement the vocab.*

Adding groups of your multiplicand slowly build arrays to show each product – concrete (counters/multi-link) or pictorial (IWB). For each say the multiplication fact in full.

Count up and down as a class. Make sure to always include 0.

For rest of lesson allow children to play games or carry out activities to further explore.

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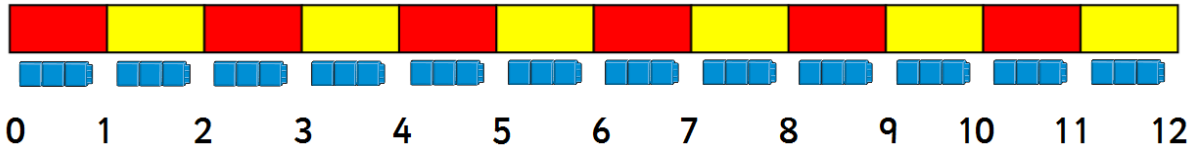
Lesson 2: L.O. We are learning to count in … **Produce an empty number track with the factors written underneath (IWB) or a counting stick. Have sticks of multi-link prebuilt to the required multiplicand.**  **Build up the products using doubling and halving, as well as adding or subtracting. Use the multi-link towers for conceptual understanding,** ***If we know …, one times, we can double this to find the product of …, two times. (repeat for x4, x8)*** ***If we know …, ten times, we can halve this to find the product of …, five times.*** ***If we know …, eight times, how could we work out the ones either side? (+ or – for x3, x7, x9)*** **Fill in the products on the empty number track or using post-it notes on the counting stick.** **Chant the whole multiplication table: … times 0 produces …, … times 1 produces …, … times 2 produces … etc.** **Count in the multiplication bonds up and down a number of times, and slowly remove different products from the number track or counting stick until they are chanting on their own.** **For rest of lesson allow children to play games or carry out activities to further explore.**	**Counting Stick: Use similar process as shown in video (script in Appendix 2): https://www.youtube.com/watch?v=yXdHGBfoqfw (watch for CPD)**

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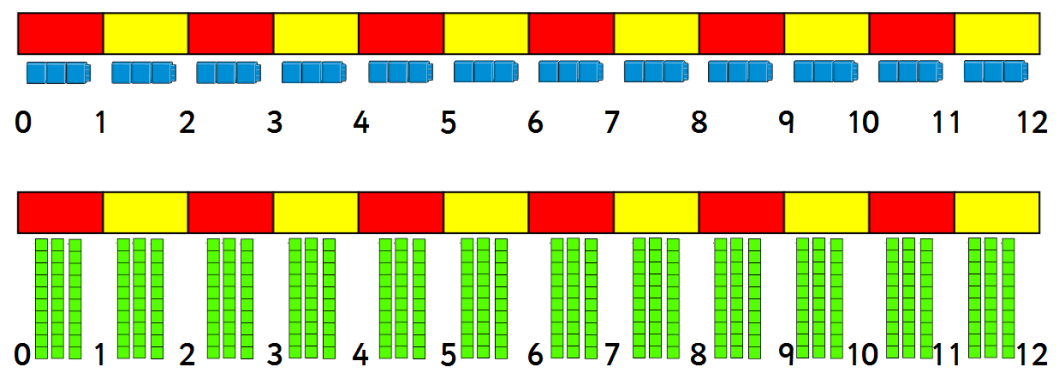
Lesson 3: L.O. We are learning to count in … and link it to … **Repeat the start of Lesson 2. Ask questions to allow children to link facts and understand the structure of multiplication.** **Next show an empty number track underneath the original, but replace the unit multiplicand with it multiplied by ten, e.g. instead of 3 cubes, put 3 ten sticks. Ask children: What is the same? What is different?**  **Build up the products using what they know – linking facts – as well as doubling and halving, adding or subtracting when required. Keep referring back to the original: What do you notice? When complete, count in the new multiplicand, e.g. 30.** **Depending on appropriateness for class, repeat for hundreds, thousands, etc.** **For rest of lesson allow children to play games or carry out activities to further explore.**	**How can I use 7x3 to work out 7x6?** **Can you find a number that is a factor of both 64 and 40?** **Why is 17 not a multiple of 3?** **True or false? 83 cannot be in the 6x table?** **If I know 3x4 is 12, what else do I know?**
Keeping Skills Shape **Games, songs (BBC Supermovers), counting-stick work, step counting using manipulatives, chanting, technology-based, quick-reaction exercises, Times Tables Rock Stars, Tests should only occur periodically (start and end of a half term) and not as the sole activity in the session – the other games and activities should enable you to formatively assess your children.**	

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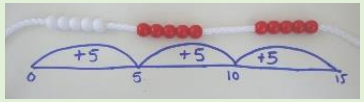
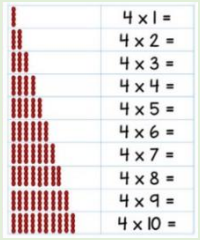
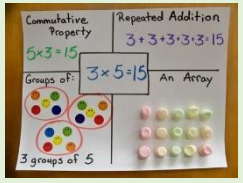
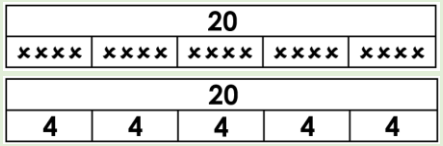
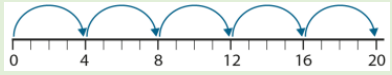
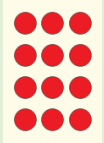
Year 4 children are required to sit a National Multiplication Check on-line. To provide them with opportunities to familiarise them with how the check occurs, time should be given to them being able to practice using a similar check (TTRS) on both Chromebooks and IPads so they are able to choose their preference for completing the check.

CPA Approach

The CPA approach helps children learn new ideas and build on their existing knowledge by introducing abstract concepts in a more familiar and tangible way. They are able to achieve a much deeper understanding if they do not have to resort to rote learning and are able to solve problems without having to memorise. Although presented as three distinct stages, we understand the need to move back and forth between stages to reinforce concepts, and that all children, however young, can see the connection between each representation.

Purpose	Concrete: *'doing' stage*	Pictorial: *'seeing' stage*	Abstract: *'symbolic' stage*
Expose structure ***There is strength in using these alongside one another - for example concrete/pictorial alongside abstract.***    	**Real-life objects in natural groups** (pairs of socks, hands, cars, dice, coins, dominoes, cards)  **Multi-link or Unifix Cubes** **Counters** **Bead strings** **Numicon pegs** **Numicon shapes** **Dienes (Base 10)** **Counting stick Cuisenaire Rods**   	**Bar Model**  **Number track**  **Number line**  **Arrays:** most versatile model for showing the properties of multiplication (repeated addition, commutative, distributive, associative and inverse of division) 	**Written equations:** **2+2+2+2+2=10** (repeated addition) **2 x 5 = 10**

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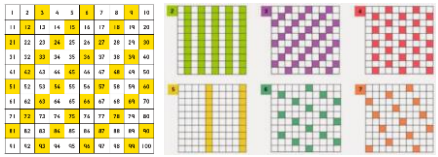
Explore pattern

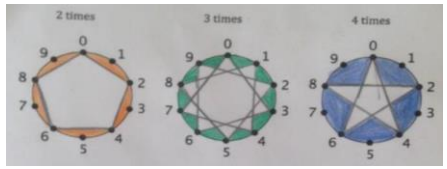
Ensure children engage with 'rich' tasks and investigations which encourage deeper knowledge and understanding, and require children to use greater levels of reasoning, conjecturing, predicting and explaining.

Hundred Square



Multiplication Circles:

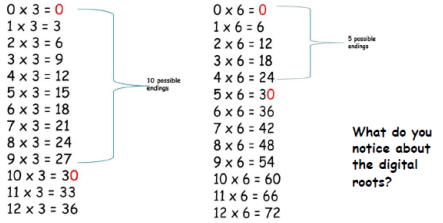
Start with a 10 point circle and connect the dots around the circle using the last digit of each product.



Multiplication Grid

×	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

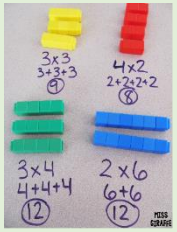
Explore the last digits of the products – investigate how many different possible endings there are.



Intelligent Practice (lesson 3)

2 × 3 =	6 × 7 =	9 × 8 =
2 × 30 =	6 × 70 =	9 × 80 =
2 × 300 =	6 × 700 =	9 × 800 =
20 × 3 =	60 × 7 =	90 × 8 =
200 × 3 =	600 × 7 =	900 × 8 =

Misconception



A common misconception stems from reading the equations incorrectly. Take for example this image. It does not show 4x2, 3x4 and 2x6. The multiplicand, the first number is telling us the group size and the second is telling us how many times. It demonstrates the need for the correct language in order for the concrete and pictorial representations to be true reflections of the multiplication taking place.

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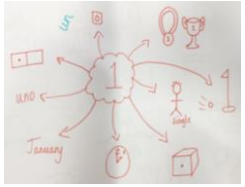
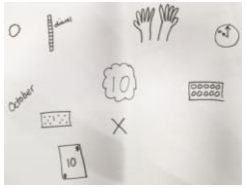
Appendix 1: The following table shows the exact multiplication bonds to be taught per half term.

Year	Autumn		Spring		Summer	
1	1.1	1.2	2.1	2.2	3.1	3.2
	Doubling 0 + 0 = 0 1 + 1 = 2 2 + 2 = 4 3 + 3 = 6 4 + 4 = 8 5 + 5 = 10 6 + 6 = 12 7 + 7 = 14 8 + 8 = 16 9 + 9 = 18 10 + 10 = 20 11 + 11 = 22 12 + 12 = 24 (13 new facts)	1x 1 x 0 = 0 1 x 1 = 1 1 x 2 = 2 1 x 3 = 3 1 x 4 = 4 1 x 5 = 5 1 x 6 = 6 1 x 7 = 7 1 x 8 = 8 1 x 9 = 9 1 x 10 = 10 1 x 11 = 11 1 x 12 = 12 (13 new facts) 	10x 10 x 0 = 0 10 x 1 = 10 10 x 2 = 20 10 x 3 = 30 10 x 4 = 40 10 x 5 = 50 10 x 6 = 60 10 x 7 = 70 10 x 8 = 80 10 x 9 = 90 10 x 10 = 100 10 x 11 = 110 10 x 12 = 120 (12 new facts) 	2x 2 x 0 = 0 2 x 1 = 2 2 x 2 = 4 2 x 3 = 6 2 x 4 = 8 2 x 5 = 10 2 x 6 = 12 2 x 7 = 14 2 x 8 = 16 2 x 9 = 18 2 x 10 = 20 2 x 11 = 22 2 x 12 = 24 (11 new facts) 	10x 10 x 0 = 0 10 x 1 = 10 10 x 2 = 20 10 x 3 = 30 10 x 4 = 40 10 x 5 = 50 10 x 6 = 60 10 x 7 = 70 10 x 8 = 80 10 x 9 = 90 10 x 10 = 100 10 x 11 = 110 10 x 12 = 120	2x 2 x 0 = 0 2 x 1 = 2 2 x 2 = 4 2 x 3 = 6 2 x 4 = 8 2 x 5 = 10 2 x 6 = 12 2 x 7 = 14 2 x 8 = 16 2 x 9 = 18 2 x 10 = 20 2 x 11 = 22 2 x 12 = 24

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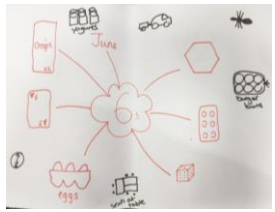
Year	Autumn		Spring		Summer	
2	1.1	1.2	2.1	2.2	3.1	3.2
	5x 5 x 0 = 0 5 x 1 = 5 5 x 2 = 10 5 x 3 = 15 5 x 4 = 20 5 x 5 = 25 5 x 6 = 30 5 x 7 = 35 5 x 8 = 40 5 x 9 = 45 5 x 10 = 50 5 x 11 = 55 5 x 12 = 60 (10 new facts)	3x 3 x 0 = 0 3 x 1 = 3 3 x 2 = 6 3 x 3 = 9 3 x 4 = 12 3 x 5 = 15 3 x 6 = 18 3 x 7 = 21 3 x 8 = 24 3 x 9 = 27 3 x 10 = 30 3 x 11 = 33 3 x 12 = 36 (9 new facts) 	6x 6 x 0 = 0 6 x 1 = 6 6 x 2 = 12 6 x 3 = 18 6 x 4 = 24 6 x 5 = 30 6 x 6 = 36 6 x 7 = 42 6 x 8 = 48 6 x 9 = 54 6 x 10 = 60 6 x 11 = 66 6 x 12 = 72 (8 new facts) 	5x 5 x 0 = 0 5 x 1 = 5 5 x 2 = 10 5 x 3 = 15 5 x 4 = 20 5 x 5 = 25 5 x 6 = 30 5 x 7 = 35 5 x 8 = 40 5 x 9 = 45 5 x 10 = 50 5 x 11 = 55 5 x 12 = 60	3x 3 x 0 = 0 3 x 1 = 3 3 x 2 = 6 3 x 3 = 9 3 x 4 = 12 3 x 5 = 15 3 x 6 = 18 3 x 7 = 21 3 x 8 = 24 3 x 9 = 27 3 x 10 = 30 3 x 11 = 33 3 x 12 = 36	6x 6 x 0 = 0 6 x 1 = 6 6 x 2 = 12 6 x 3 = 18 6 x 4 = 24 6 x 5 = 30 6 x 6 = 36 6 x 7 = 42 6 x 8 = 48 6 x 9 = 54 6 x 10 = 60 6 x 11 = 66 6 x 12 = 72

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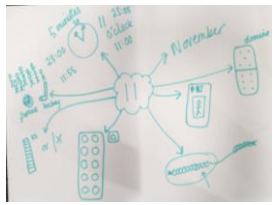
Year	Autumn		Spring		Summer	
3	1.1	1.2	2.1	2.2	3.1	3.2
	4x 4 x 0 = 0 4 x 1 = 4 4 x 2 = 8 4 x 3 = 12 4 x 4 = 16 4 x 5 = 20 4 x 6 = 24 4 x 7 = 28 4 x 8 = 32 4 x 9 = 36 4 x 10 = 40 4 x 11 = 44 4 x 12 = 48 (7 new facts) 	8x 8 x 0 = 0 8 x 1 = 8 8 x 2 = 16 8 x 3 = 24 8 x 4 = 32 8 x 5 = 40 8 x 6 = 48 8 x 7 = 56 8 x 8 = 64 8 x 9 = 72 8 x 10 = 80 8 x 11 = 88 8 x 12 = 96 (6 new facts) 	11x 11 x 0 = 0 11 x 1 = 11 11 x 2 = 22 11 x 3 = 33 11 x 4 = 44 11 x 5 = 55 11 x 6 = 66 11 x 7 = 77 11 x 8 = 88 11 x 9 = 99 11 x 10 = 110 11 x 11 = 121 11 x 12 = 132 (5 new facts) 	4x 4 x 0 = 0 4 x 1 = 4 4 x 2 = 8 4 x 3 = 12 4 x 4 = 16 4 x 5 = 20 4 x 6 = 24 4 x 7 = 28 4 x 8 = 32 4 x 9 = 36 4 x 10 = 40 4 x 11 = 44 4 x 12 = 48	8x 8 x 0 = 0 8 x 1 = 8 8 x 2 = 16 8 x 3 = 24 8 x 4 = 32 8 x 5 = 40 8 x 6 = 48 8 x 7 = 56 8 x 8 = 64 8 x 9 = 72 8 x 10 = 80 8 x 11 = 88 8 x 12 = 96	11x 11 x 0 = 0 11 x 1 = 11 11 x 2 = 22 11 x 3 = 33 11 x 4 = 44 11 x 5 = 55 11 x 6 = 66 11 x 7 = 77 11 x 8 = 88 11 x 9 = 99 11 x 10 = 110 11 x 11 = 121 11 x 12 = 132

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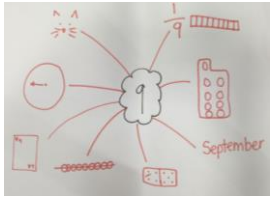
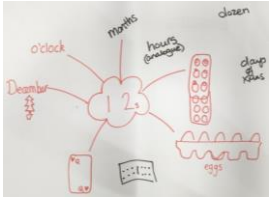
Year	Autumn		Spring		Summer	
4	1.1	1.2	2.1	2.2	3.1	3.2
	7x 7 x 0 = 0 7 x 1 = 7 7 x 2 = 14 7 x 3 = 21 7 x 4 = 28 7 x 5 = 35 7 x 6 = 42 7 x 7 = 49 7 x 8 = 56 7 x 9 = 63 7 x 10 = 70 7 x 11 = 77 7 x 12 = 84 (4 new facts) 	**9x** 9 x 0 = 0 9 x 1 = 9 9 x 2 = 18 9 x 3 = 27 9 x 4 = 36 9 x 5 = 45 9 x 6 = 54 9 x 7 = 63 9 x 8 = 72 9 x 9 = 81 9 x 10 = 90 9 x 11 = 99 9 x 12 = 108 (3 new facts) 	**12x** 12 x 0 = 0 12 x 1 = 12 12 x 2 = 24 12 x 3 = 36 12 x 4 = 48 12 x 5 = 60 12 x 6 = 72 12 x 7 = 84 12 x 8 = 96 12 x 9 = 108 12 x 10 = 120 12 x 11 = 132 12 x 12 = 144 (2 new facts) 	**7x** 7 x 0 = 0 7 x 1 = 7 7 x 2 = 14 7 x 3 = 21 7 x 4 = 28 7 x 5 = 35 7 x 6 = 42 7 x 7 = 49 7 x 8 = 56 7 x 9 = 63 7 x 10 = 70 7 x 11 = 77 7 x 12 = 84 Plus daily revision of multiplication bonds to 12x12 *(focus on one or mixed based on cohort need)*	**12x** 12 x 0 = 0 12 x 1 = 12 12 x 2 = 24 12 x 3 = 36 12 x 4 = 48 12 x 5 = 60 12 x 6 = 72 12 x 7 = 84 12 x 8 = 96 12 x 9 = 108 12 x 10 = 120 12 x 11 = 132 12 x 12 = 144 Plus daily revision of multiplication bonds to 12x12 *(focus on one or mixed based on cohort need)*	**0x** 0 x 0 = 0 0 x 1 = 0 0 x 2 = 0 0 x 3 = 0 0 x 4 = 0 0 x 5 = 0 0 x 6 = 0 0 x 7 = 0 0 x 8 = 0 0 x 9 = 0 0 x 10 = 0 0 x 11 = 0 0 x 12 = 0 (1 new fact) Plus daily revision of multiplication bonds to 12x12 *(focus on one or mixed based on cohort need)*

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Year	Autumn		Spring		Summer	
5	1.1	1.2	2.1	2.2	3.1	3.2
	Squares All previous squares from 1^2 to 12^2, plus: $0^2 = 0$ $13^2 = 169$ $14^2 = 196$ $15^2 = 225$ $16^2 = 256$ $17^2 = 289$ $18^2 = 324$ $19^2 = 361$ $20^2 = 400$ (9 new facts) Plus weekly revision mixed multiplication bonds to 12x12	**25x** 25 x 0 = 0 25 x 1 = 25 25 x 2 = 50 25 x 3 = 75 25 x 4 = 100 25 x 5 = 125 25 x 6 = 150 25 x 7 = 175 25 x 8 = 200 25 x 9 = 225 25 x 10 = 250 (11 new facts) Plus weekly revision mixed multiplication bonds to 12x12	**0.25x** 0.25 x 0 = 0 0.25 x 1 = 0.25 0.25 x 2 = 0.5 0.25 x 3 = 0.75 0.25 x 4 = 1 0.25 x 5 = 1.25 0.25 x 6 = 1.5 0.25 x 7 = 1.75 0.25 x 8 = 2 0.25 x 9 = 2.25 0.25 x 10 = 2.5 (11 new facts) Plus weekly revision mixed multiplication bonds to 12x12	**Squares** All previous squares from 1^2 to 12^2, plus: $0^2 = 0$ $13^2 = 169$ $14^2 = 196$ $15^2 = 225$ $16^2 = 256$ $17^2 = 289$ $18^2 = 324$ $19^2 = 361$ $20^2 = 400$ Plus weekly revision mixed multiplication bonds to 12x12	**19x Table** 19 x 0 = 0 19 x 1 = 19 19 x 2 = 38 19 x 3 = 57 19 x 4 = 76 19 x 5 = 95 19 x 6 = 114 19 x 7 = 133 19 x 8 = 152 19 x 9 = 171 19 x 10 = 190 (11 new facts) Plus weekly revision mixed multiplication bonds to 12x12	**19x Table** 19 x 0 = 0 19 x 1 = 19 19 x 2 = 38 19 x 3 = 57 19 x 4 = 76 19 x 5 = 95 19 x 6 = 114 19 x 7 = 133 19 x 8 = 152 19 x 9 = 171 19 x 10 = 190 Plus weekly revision mixed multiplication bonds to 12x12

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Year	Autumn		Spring		Summer	
6	1.1	1.2	2.1	2.2	3.1	3.2
	Cubes $0^3 = 0$ $1^3 = 1$ $2^3 = 8$ $3^3 = 27$ $4^3 = 64$ $5^3 = 125$ $6^3 = 216$ $7^3 = 343$ $8^3 = 512$ $9^3 = 729$ $10^3 = 1000$ $11^3 = 1331$ $12^3 = 1728$ (13 new facts) Plus weekly revision mixed multiplication bonds to 12x12	**75x Table** 75 x 0 = 0 75 x 1 = 75 75 x 2 = 150 75 x 3 = 225 75 x 4 = 300 75 x 5 = 375 75 x 6 = 450 75 x 7 = 525 75 x 8 = 600 75 x 9 = 675 75 x 10 = 750 (11 new facts) Plus weekly revision mixed multiplication bonds to 12x12	**0.75x Table** 0.75 x 0 = 0 0.75 x 1 = 0.75 0.75 x 2 = 1.5 0.75 x 3 = 2.25 0.75 x 4 = 3 0.75 x 5 = 3.75 0.75 x 6 = 4.5 0.75 x 7 = 5.25 0.75 x 8 = 6 0.75 x 9 = 6.75 0.75 x 10 = 7.5 (11 new facts) Plus weekly revision mixed multiplication bonds to 12x12	**Cubes** $0^3 = 0$ $1^3 = 1$ $2^3 = 8$ $3^3 = 27$ $4^3 = 64$ $5^3 = 125$ $6^3 = 216$ $7^3 = 343$ $8^3 = 512$ $9^3 = 729$ $10^3 = 1000$ $11^3 = 1331$ $12^3 = 1728$ Plus weekly revision mixed multiplication bonds to 12x12	**17x Table** 17 x 0 = 0 17 x 1 = 25 17 x 2 = 50 17 x 3 = 75 17 x 4 = 100 17 x 5 = 125 17 x 6 = 150 17 x 7 = 175 17 x 8 = 200 17 x 9 = 225 17 x 10 = 250 (11 new facts) Plus weekly revision mixed multiplication bonds to 12x12	**Consolidation** Choose those Multiplication Bonds with which the cohort needs work on. Plus weekly revision mixed multiplication bonds to 12x12

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<u>Appendix 2:</u> Script for using a counting stick to teach multiplication bonds on.

Learning the 7 times table (adapt for times table being learnt)

Step 1: What number do we always start with?

Step 2: What times table are we learning?

(repeat steps 1&2)

Step 3: Can you multiply it by 10?

(repeat steps 1&2)

Step 4: Can you double it?

Step 5: Can you double that?

(repeat steps 1-5 in order)

Step 6: I have a very special number to tell you and it is called the key. Our key in this times table is 21. What is our key?

Step 7: Can you double the key?

Step 8: This is really hard now, can you triple the key?

(Repeat steps 1-8 in order)

Step 9: Who remembers our key? (*children answer*) Double it. Now add seven

(repeat steps 1-9)

Step 10: Everybody touch your nose. That's 35. Touch your nose.

Step 11: Now everybody needs to help me. There is one number I always forget. It's 56. What number do I always forget?

(Repeat steps 1-11)

Begin to remove the cards as children become more confident with remembering

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<u>Appendix 3:</u> Ideas for 'What comes in …'