Mathematics @ Chacewater School

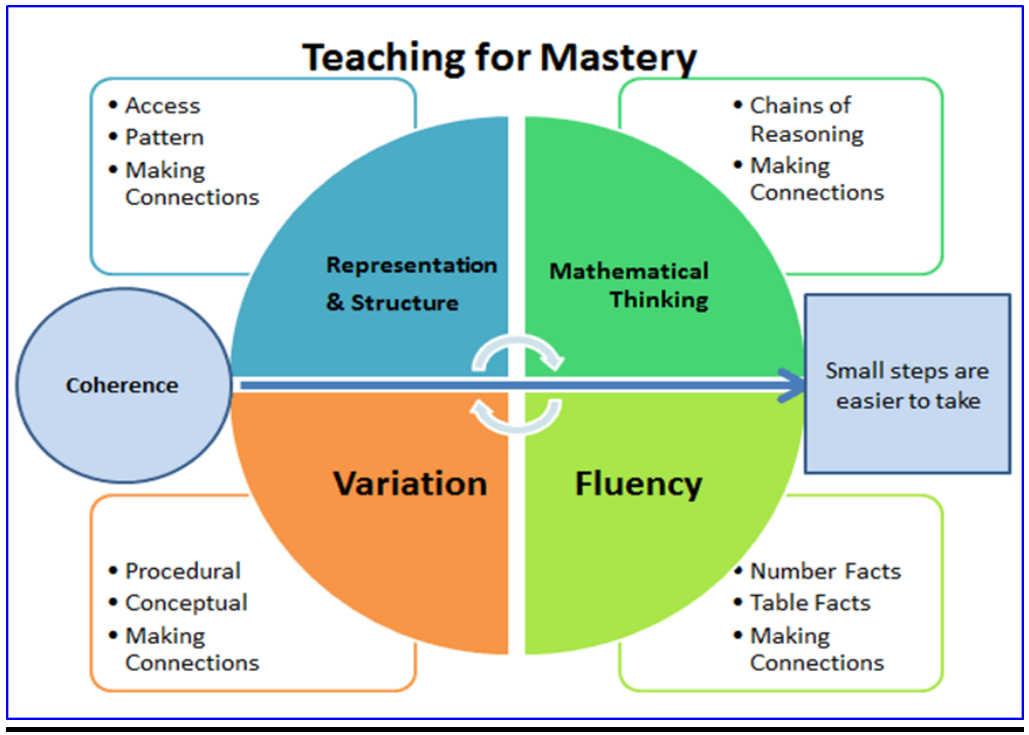
Intent	The national curriculum for mathematics aims to ensure that all pupils: •become fluent in the fundamentals of mathematics •reason mathematically by following a line of enquiry, conjecture relationships and generalisations, and develop an argument, justification or proof using mathematical language •can solve problems by applying their mathematics to a variety of routine and non routine problems. At Chacewater we want all of our children to enjoy mathematics, whilst ensuring that everyone is supported to be able to succeed in the subject and acquire the mathematical skills and knowledge that they need for later life. By lacing calculation, reasoning and problem solving into a series of lessons, we ensure that secure links are made and that prior knowledge is being tested and challenged throughout. Our aspiration is for every child to see themselves as a mathematician - demonstrating a confident attitude towards tackling problems both in and out of the classroom and understanding the importance of maths in the wider world.
Implementation	At Chacewater we follow a mastery led model for the teaching of mathematics. Sequences of learning are built in small sequential steps within our pedagogical approach of 'Teach, Challenge, Learn, Understand'. This 'Maths @ Chacewater' document intends to make clear what each of these stage could look like and how these should be closely related and linked to the five big ideas of fluency, variation, representation & structure, mathematical thinking and coherence. Maths is taught daily in the school in all classes, with our sequence of learning being pulled from White Rose maths, which gives a consistent and coherence across the school. However, our expectation is that this is not used as a scheme and only used to help aid the planning process by teachers. Blocks of learning are taught using a linear approach, allowing children to 'linger longer' on core concepts and to develop a depth of understanding within their year group's objectives.

	A wide range of trusted resources are used to support learning including, Kangaroo Maths, NCETM spine and ready to progress materials, I See Reasoning, I See Problem Solving, Time table Rockstars, Numbots and Testbase. Carefully planned variation builds fluency and understanding of underlying mathematical concepts. Time outside of the maths lesson is dedicated to the revisiting and retrieval of key declarative knowledge and rapid, fluid interventions are put in place to support those children that need it. Each year group focuses on **Key Instant Recall Facts (KIRFs)** that should be known by the end of each half term - there is a daily focus on these. Planning utilises the idea of small step progression and these are shared with the children so that they can understand the mathematical journey and how it builds. 'S' planning is utilised to help teachers think about the learning progression for their own class over a week or two week block and learning slides further support this. Ongoing assessment is crucial and is used to adjust and inform planned next steps. Both **concrete resources (manipulatives) and pictorial representations** are routinely used to support **all** children, including children with SEND. These are also referenced in our calculation guidance.
Impact	Teachers will continuously formatively assess children's understanding and use this to adjust and inform the next steps in the teaching sequence. This is supported by utilising a range of reasoning and problem-solving activities i.e. Test Base to check children's ability to use and apply the mathematics taught. There is a regular cycle of assessment in place, which includes termly NFER tests in key stage 2 and termly teacher assessment across the school. Wider impact is measured through a triangulated approach. Exploring attitude and confidence with mathematics through pupil conferencing in conjunction with exploring evidence in books. The journey of the mathematics the children are learning should be clear and the children should be able to confidently articulate this.

‘L E A P’ Into Maths at Chacewater

L ocal	Where possible we look to link learning to our own school’s contextual background. This is includes taking note of children’s starting points and prior learning. With this is mind, although we use White Rose to help support and guide our sequence of learning, this is not used as a scheme and the expectation is that lessons and sequences are adapted to meet the needs of our children. We use ‘S’ planning to support this approach.
E ngaging	It is important that mathematics is engaging for all of our children and to support this we ensure that there are a range of learning activities and resources to support. This includes consistent use of representations and structures. We aim to engage children in the learning by encouraging them to frequently explore, reason and problem solve. This is supported by high quality resources such as the ‘I See Reasoning’ resources. NRICH, NCETM spine and ready to progress materials. Across the school we use a range if interactive resources and learning activities so that learning is not just worksheet based. This includes frequent opportunities for discussion (supported with STEM sentences) and interactive resources such as TTRS and Numbots. WE ALWAYS LOOK TO REWARD AND CELEBRATE EVERY SUCCESS IN MATHS.
A spiring & Ambitious	Our aim to take all children through the same mathematical journey. The use of low threshold and high ceiling activities supports this, as well as rapid interventions, including same day interventions and pre-teach. The ‘challenge’ aspect of our pedagogical approach allows us to look for opportunities to add a ‘twist’ or ‘confuse’ aspect into learning to really promote a depth of understanding!
P owerful & purposeful	In line with other aspects of our curriculum regular review and opportunities to practise retrieval are important to ensure that learning is retained, is powerful and purposeful. To facilitate this, previous areas of learning are regularly revisited outside of the maths lesson to ensure that key areas remain fresh in the children’s memory i.e. written calculations. This includes the use of morning boards and resources such as Flashback 4. Reasoning and Problem Solving should be weaved through all aspects of maths to ensure that all children are given the opportunity to be able to apply their mathematical knowledge.

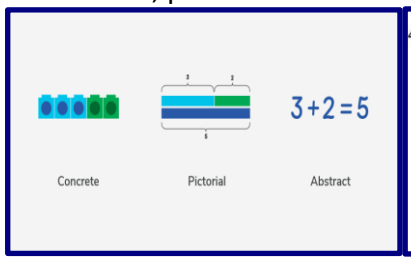
At Chacewater we follow a mastery led model for the teaching of mathematics. Sequences of learning are built in small sequential steps within our pedagogical approach of 'Teach, Challenge, Learn, Understand'. This 'Maths @ Chacewater' document intends to make clear what each of these stage could look like and how these should be closely related and linked to the five big ideas fluency, variation, representation & structure, mathematical thinking and coherence.

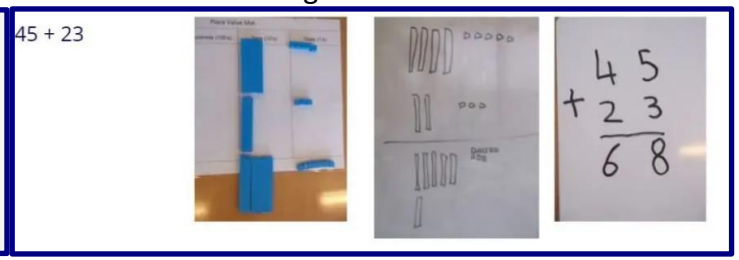


Our aim is that children work broadly at the same pace, focusing on increasing a depth of understanding rather than a focus on progressing beyond ARE. Rapid interventions should be in place for children that need to consolidate their understanding before moving on.

TEACH	The National Curriculum states that children should become fluent in the fundamentals of mathematics through varied and frequent practice, and this is the main aim of our 'Teach' phase. While a part of this is about knowing key mathematical facts and recalling them efficiently, the ability to be fluent in maths gives pupils the resilience and understanding to delve deeper into all areas of mathematical learning. Regular development will allow them to build a stronger number sense and choose the most appropriate method for the task at hand. This will enable them to be better equipped to grapple with many variations of mathematical concepts and problems.

- Concrete resources are routinely used to support learning. These are used by all children and help children to understand the underlying structure of the maths being taught. Key resources include **PV counters, dienes (base 10), PV grids, numicon and hundred squares.**
- Side by side modelling of the concrete, pictorial and abstract is crucial at this stage.





LEARN

At this stage children should be given an opportunity to build learning and the use of carefully structured questions should be in place, including:

- use of variation to help scaffold and draw links in learning. Deliberate choice of question and thinking about what we want to draw attention to.
- choice of the most efficient calculation strategy i.e. mental or written
- pattern seeking
- continued support with concrete and pictorial, moving to the abstract.

Variation – drawing attention to relationships.

120 – 90
122 – 92
119 – 89
235 – 180
237 – 182
502 – 397

430 – 30 =
430 – 40=
430 – 50 =
520 – 30 =
520 – 31 =
520 – 29 =

3 + 6 =
30 + 60 =
300 + 600 =

$\frac{1}{4}$ *of* 12 = ?

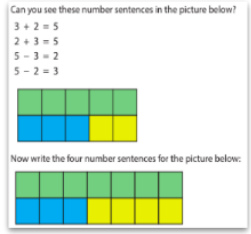
$\frac{1}{4}$ *of* 120 = ?

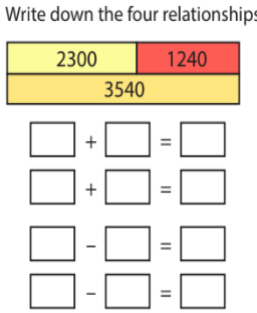
$\frac{1}{4}$ *of* 1200 = ?

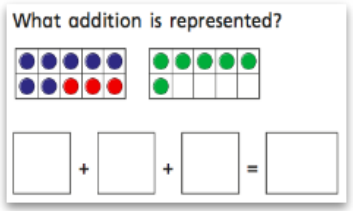
$\frac{3}{4}$ *of* 12 = ?

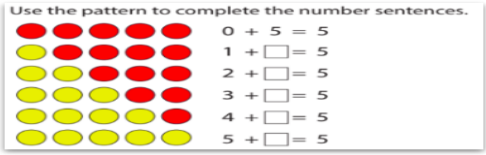
$\frac{3}{4}$ *of* 1200 = ?

Exploring mathematics - identifying structure.

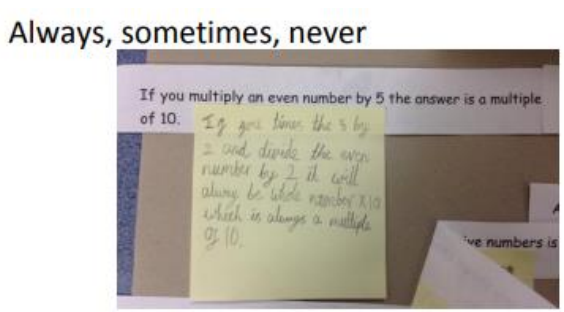


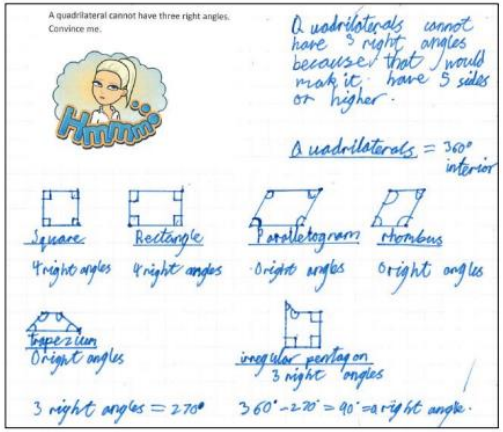


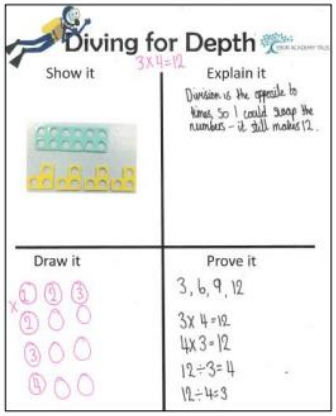


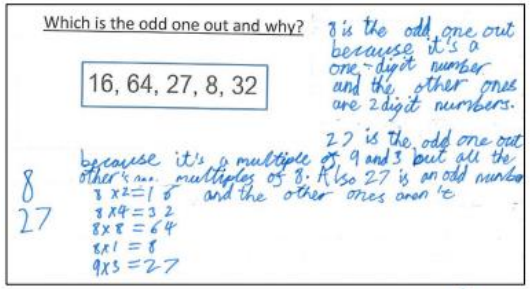


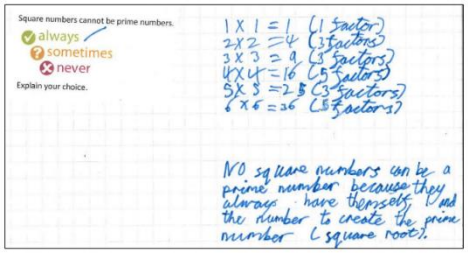
CHALLENGE	In order to ensure deep understanding, challenge elements will be incorporated in to the teaching sequence. The challenge could be a 'twist' or a 'confuse' question within the lesson or an activity within the books. Such activities allow the children to demonstrate their knowledge in a different way and thus provides depth of understanding. These can be written or through verbal discussion and applies to all year groups. Reasoning and Problem Solving should flow through all of our maths lessons and not reserved purely as extension activities. In all cases it is crucial that there is explicit teaching and modelling of how to tackle such problems. Examples below include opportunities to develop efficiency, conjecture and solve missing digit problems.

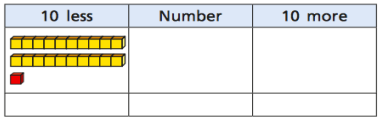


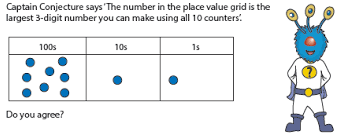


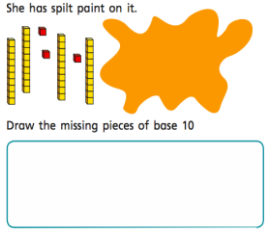


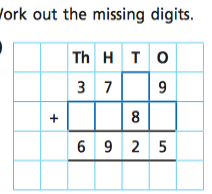




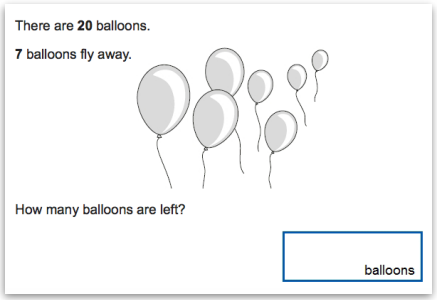








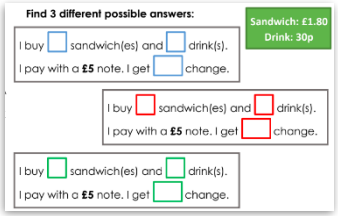
UNDERSTAND	It is crucial that all children have the opportunity to apply their mathematical knowledge in a variety of different contexts and can actively problem solve. This includes being able to solve single and multi-step problems, relevant to age and stage. We use Testbase as resources to find a range of different problems and the expectation is that children are explicitly taught how to solve these. Such problems may at times draw in other areas of previous learning to aid the problem solving process.


There are **20** balloons.

7 balloons fly away.

How many balloons are left?

balloons


Find 3 different possible answers:

Sandwich: £1.80
Drink: 30p

I buy ☐ sandwich(es) and ☐ drink(s).
I pay with a **£5** note. I get ☐ change.

I buy ☐ sandwich(es) and ☐ drink(s).
I pay with a **£5** note. I get ☐ change.

I buy ☐ sandwich(es) and ☐ drink(s).
I pay with a **£5** note. I get ☐ change.


Look at these coins:

What is the largest amount you can make using **three** of these coins?

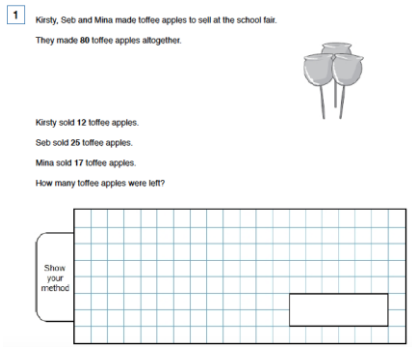
p


A shopkeeper has **20** fish and **5** fish bowls.

He puts the same number of fish in each bowl.

How many fish go in each bowl?

fish


1 Kirsty, Seb and Mina made toffee apples to sell at the school fair.

They made **80** toffee apples altogether.

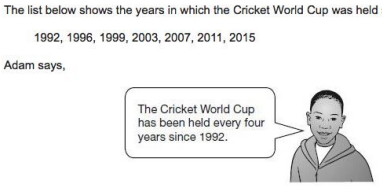
Kirsty sold **12** toffee apples.

Seb sold **25** toffee apples.

Mina sold **17** toffee apples.

How many toffee apples were left?

Show your method


The list below shows the years in which the Cricket World Cup was held since 1992:

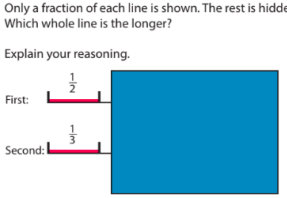
1992, 1996, 1999, 2003, 2007, 2011, 2015

Adam says,

The Cricket World Cup has been held every four years since 1992.

Adam is **not** correct.

Explain how you know.


Only a fraction of each line is shown. The rest is hidden behind the blue screen.
Which whole line is the longer?

Explain your reasoning.

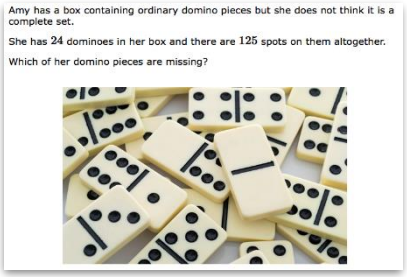
First: $\frac{1}{2}$

Second: $\frac{1}{3}$

Megan has read $\frac{3}{5}$ of her book.

She has 90 pages left to read.

How many pages long is her book?


Amy has a box containing ordinary domino pieces but she does not think it is a complete set.

She has 24 dominoes in her box and there are 125 spots on them altogether.

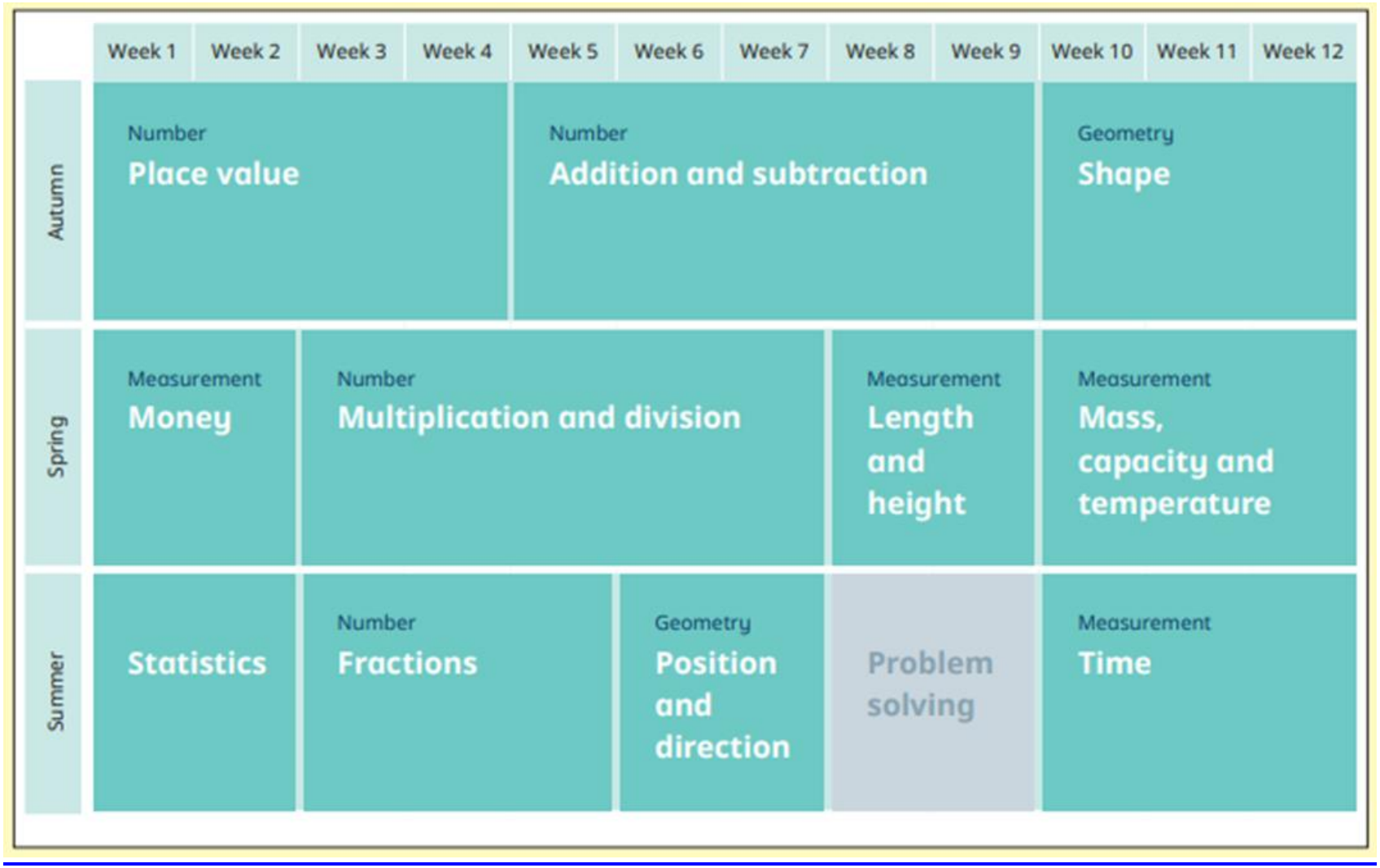
Which of her domino pieces are missing?

Sequence of Learning - Reception

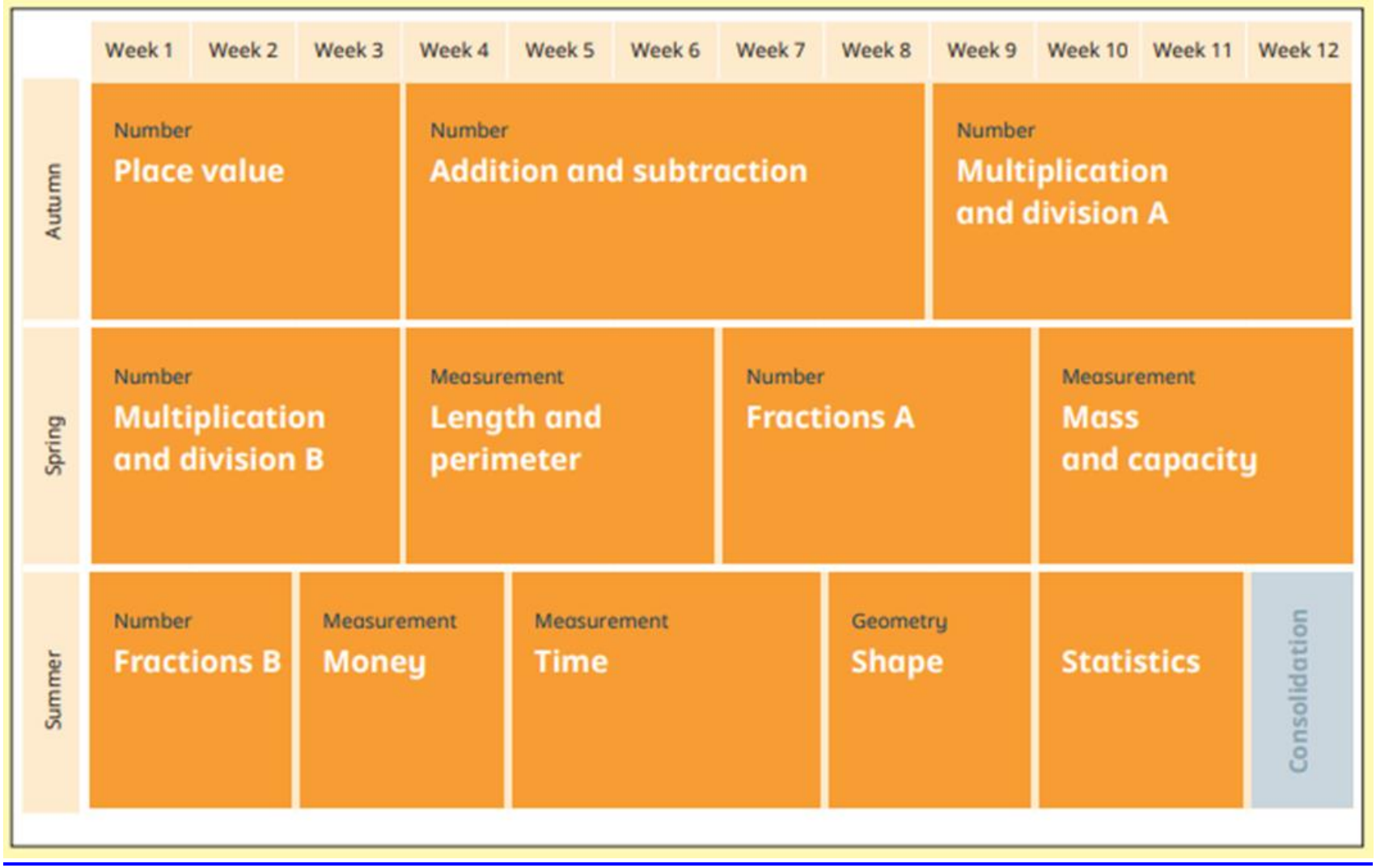
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Getting to Know You			Just Like Me!			It's Me 1 2 3!			Light and Dark			Consolidation	
Spring	Alive in 5!			Growing 6, 7, 8			Building 9 and 10			Consolidation				
Summer	To 20 and Beyond			First Then Now			Find My Pattern			On The Move				

Sequence of Learning - Year 1

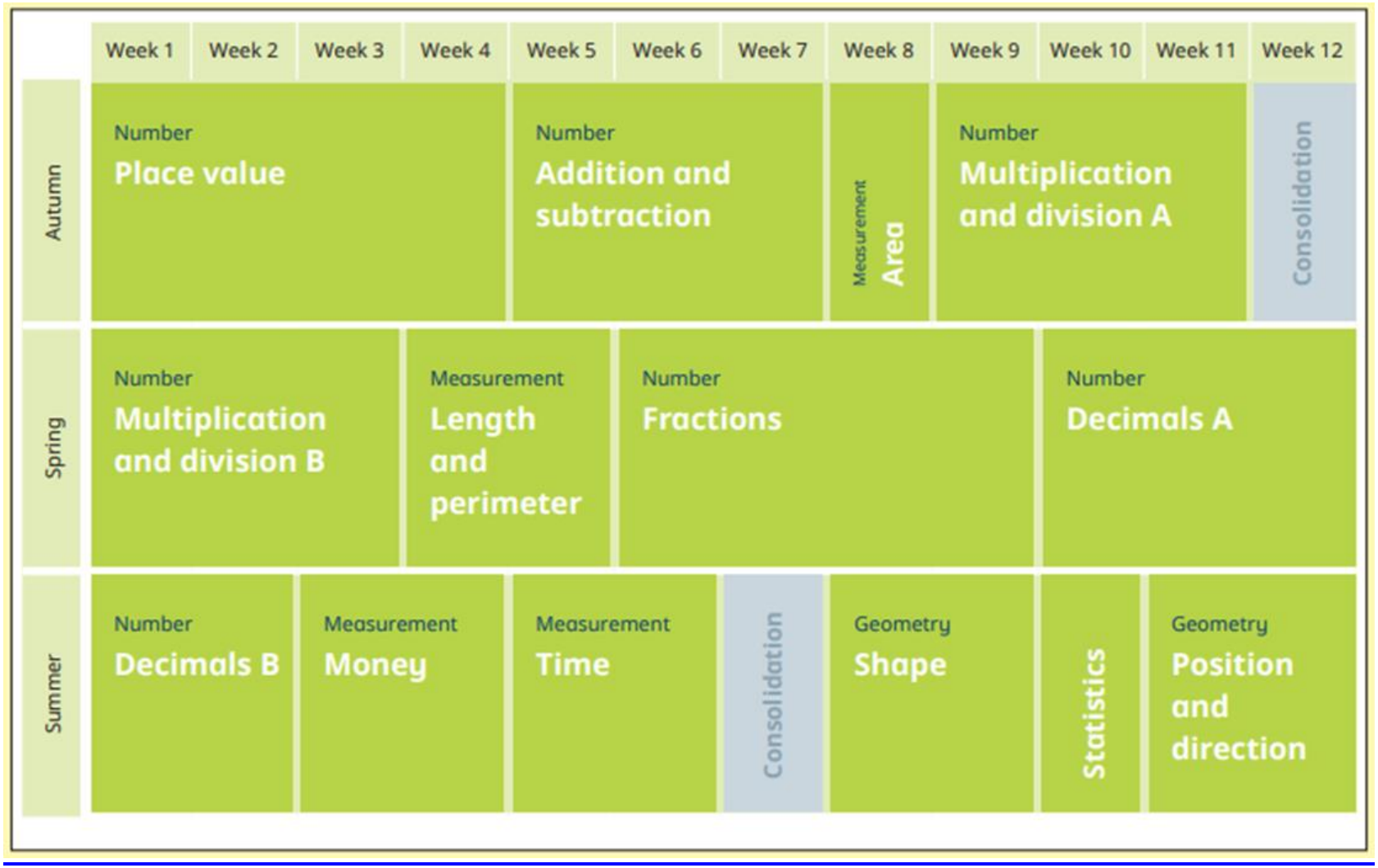
Sequence of Learning - Year 2



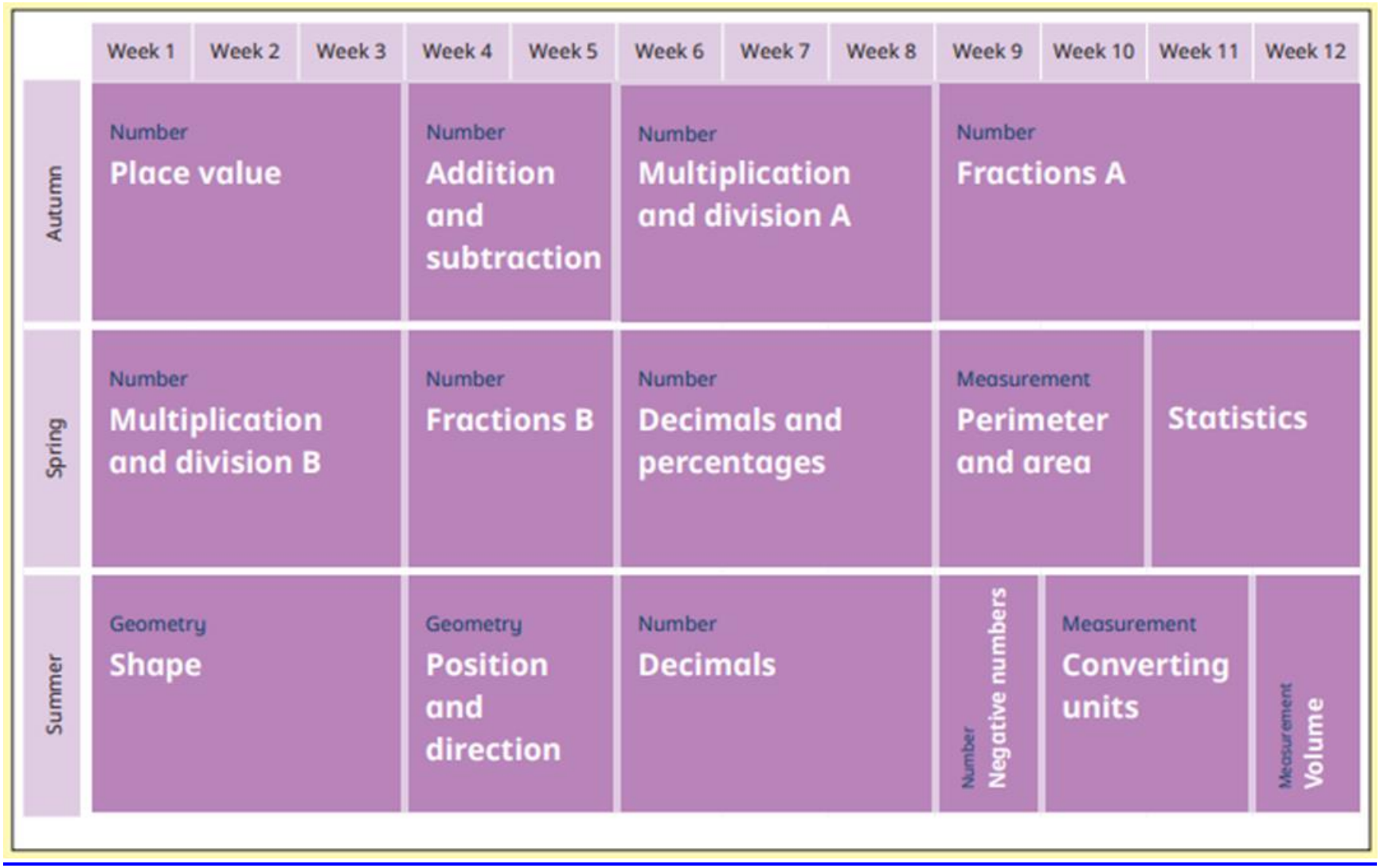
Sequence of Learning - Year 3



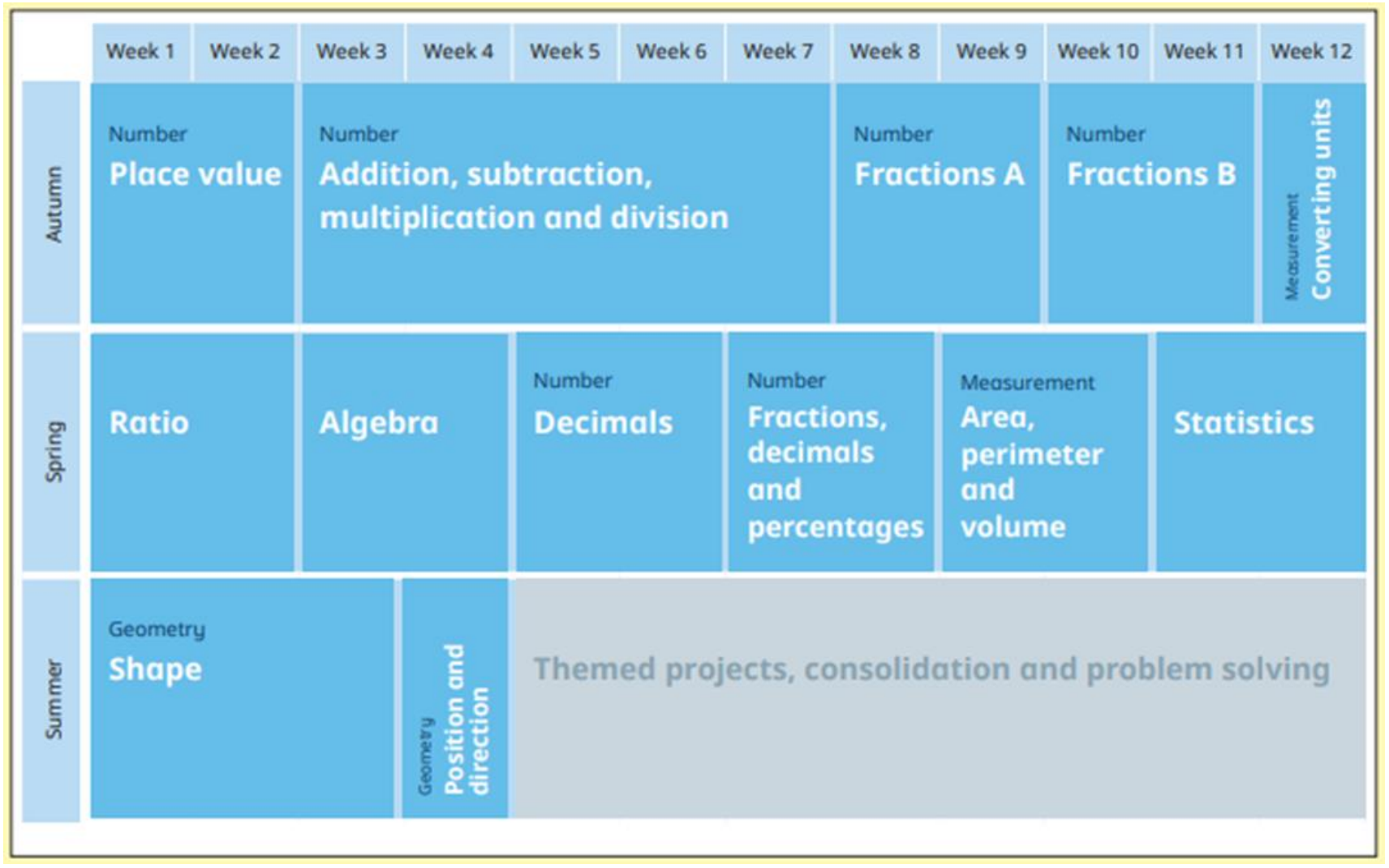
Sequence of Learning - Year 4



Sequence of Learning - Year 5



Sequence of Learning - Year 6

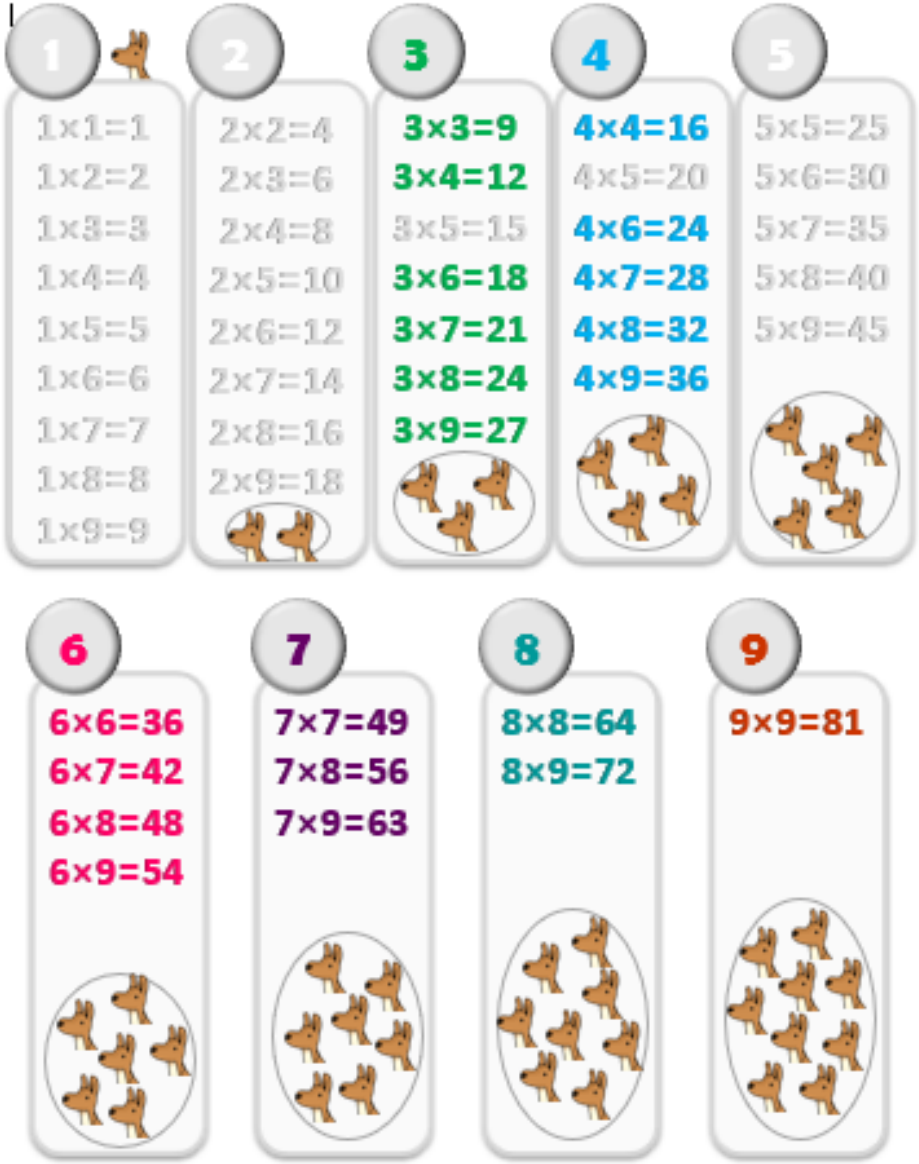


Key Instant Recall Facts (KIRFs) at Chacewater

The table below outlines KIRFs that should be learnt with regular daily practice, in addition to the normal maths lesson. Often this may be part of the routine first thing in the morning. **Times Tables Expectations in red and there should be daily practice ongoing of these.**

	R	Y1	Y2	Y3	Y4	Y5	Y6
Autumn 1	Know and say the numbers from 0 to 5 and back from 5 to 0.	Know all number bonds for 5.	Know all number bonds for 10 and 20.	Know all the number bonds for each number to 20 e.g. 13+6 = 19	Know all number bonds for 100.	Know all decimals that total 1 or 10 (decimal place) e.g. 0.3 + 0.7 = 1 and 6.2 + 3.8 = 10.	Know all previous learnt number bonds (including decimals)
Autumn 2	Know and say the numbers from 0 to 10 and back from 10 to 0.	Know all number bonds for 10.	**Know multiplication and division facts for 2x table.**	**Know multiplication and division facts for 2x, 4x and 8x table.**	**Know multiplication and division facts for 7x table.**	**Consolidate all multiplication and division facts for all tables.**	Derive multiplication and division facts using decimal numbers e.g. 8 x 7 = 56 so 8 x 0.7 = 5.6.
Spring 1	Know how to partition numbers to 5 into two groups.	Know all number bonds for 20.	**Know multiplication and division facts for 10x table.**	Know doubles and halves of all whole numbers to 20. e.g. 12 doubled is 24 and 12 halved is 6.	Know all pairs of multiples of 50 with a total of 1000 e.g. 350 + 650 = 1000.	Know the doubles and halves of all two digit numbers.	Know the doubles and halves of all two digit decimals.
Spring 2	Know how to partition numbers to 10 into two groups.	Know all doubles and halves of even number to 20.	Know the halves of 1,3,5,7,9 e.g. half of 3 is 1 ½	Know all number bonds for100 using multiples of 5.	Know the decimal equivalents of the fractions ½, ¼, ¾, ⅓, ⅔, 1/10 and ⅕.	Know the prime numbers up to 100.	Know all the square numbers to 12 x 12.
Summer 1	Be able to read and write numbers to 20.	Know all addition and subtraction facts for all numbers between 0 and 10.	Know all addition and subtraction facts for multiples of 10 to 100.	**Know all multiplication and division facts for the 3,6 and 9 times tables.**	**Know multiplication and division fact for 11x and 12x table.**	Know all pairs of factors of numbers up to 100.	Know the square roots of all numbers to 15 x 15.
Summer 2	Be able to add and subtract single digit numbers by counting on or back.	Count forwards and backwards in steps of 2,5 and 10.	**Know multiplication and division facts for 5x table.**	**Know all multiplication and division facts for 2x,5x and 10x table. (instant recall)**	Know all number bonds for £1 using decimal notation.	Know the decimal and percentage equivalents of ½, ¼, ¾, ⅓, ⅔, 1/10 and ⅕.	Find a percentage of an amount and reduce by a percentage.

Times tables: the 21 facts*



Examples of S Planning – identifying small steps progression.