Mathematics at Reinwood Junior School

Year 3 Parent Booklet

Year 3 Mathematics – Reinwood Junior School

Mathematics at Reinwood Junior School:

Mathematics lessons include daily practice in mental and oral arithmetic skills and comprehensive teaching and learning in number, shape, space, measures and data handling. Children are also encouraged to solve puzzles and problems. The Mathematics Curriculum is delivered through year group long-term planning. Lessons are planned using government approved materials and a wealth of resources, such as the 'White Rose' mathematics programme, those from other commercial schemes and ideas from our own bank of resources. Teachers ensure that, where appropriate, maths is taught in a practical way and is applied to a real life context. Year groups are well equipped with resources to facilitate interactive teaching. All teaching and learning in maths is tailored to every child's needs. This booklet contains the information that we feel you might find useful to see what your child is learning. The full documents are available on our website (reinwoodjuniorschool.com).

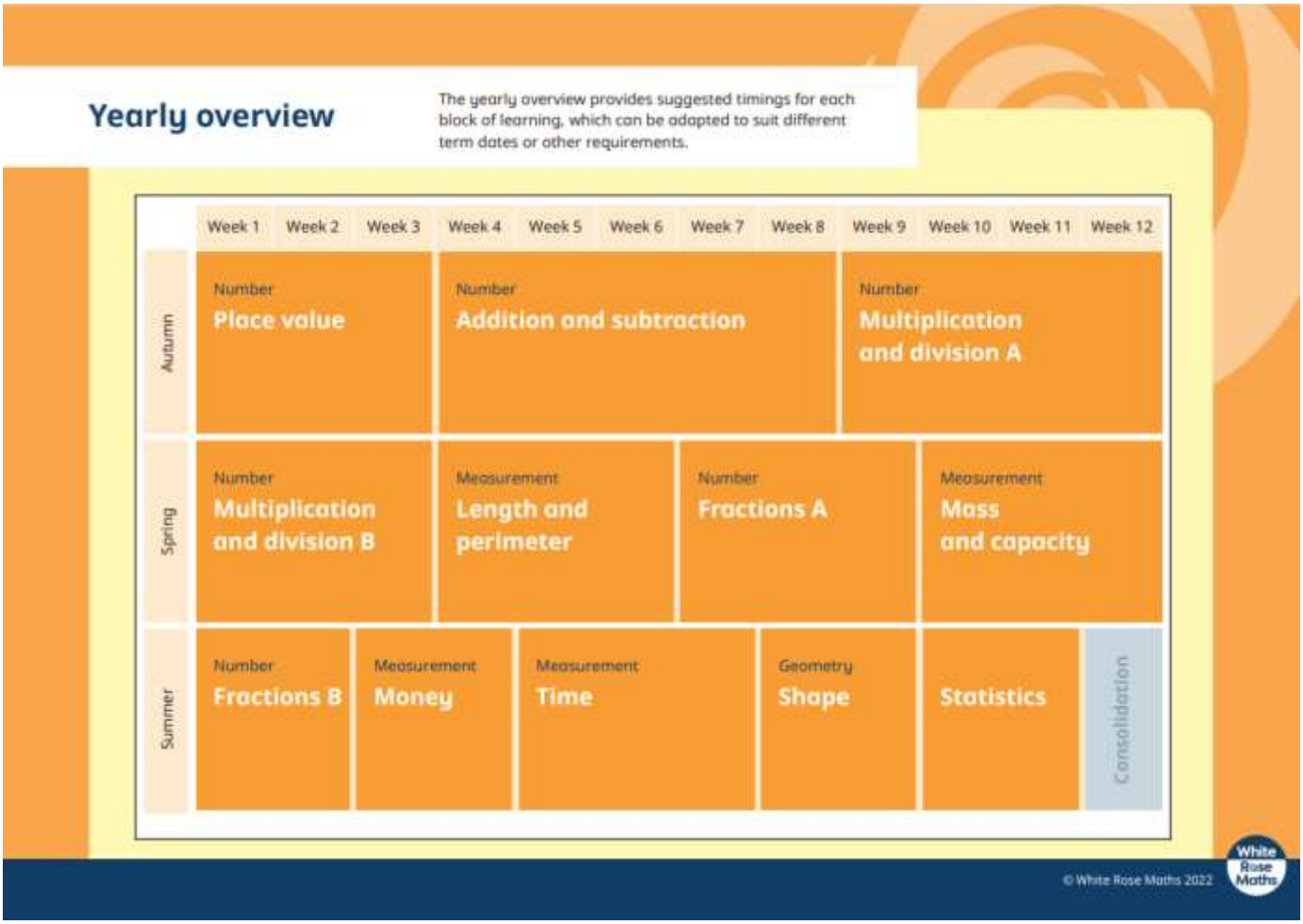
Within this booklet is:

- The Year 3 Mathematics Overview
- The Addition and Subtraction Calculation Policy
- The Multiplication and Division Calculation Policy
- A Year 3 Sample Lesson Format
- Times Tables at Reinwood Junior School
- KIRFs (Key Instant Recall Facts)
- Glossary of Terms

Year 3 Mathematics – Reinwood Junior School

The Year 3 Mathematics Overview:

In each of the major topic areas (Number, Measurement, Geometry and Statistics), the curriculum has been broken down into key areas. For each of the terms, each area has been broken down into blocks, shown below is the length of time (in weeks) that is spent on each in class. At the end of each block (for example at the end of Week 3 'Number: Place Value') there will be an 'End of Block' assessment so that your child's class teacher can see the progress and any areas of need to focus on in future lessons.

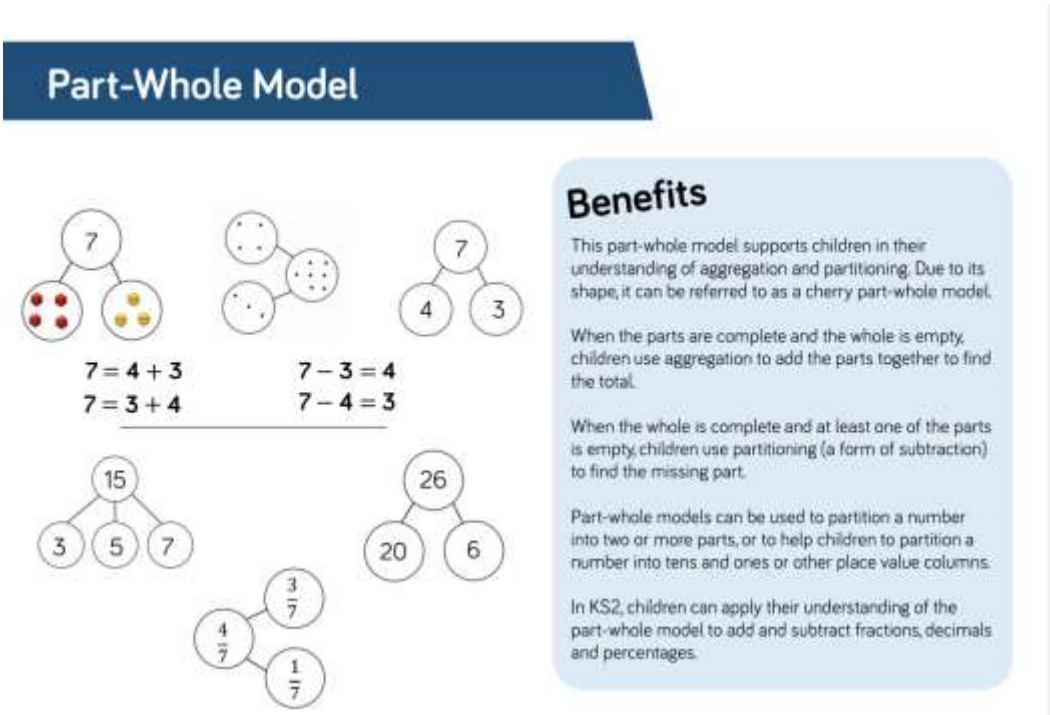


N.B. The above information can be subject to variation depending on events within the school calendar.

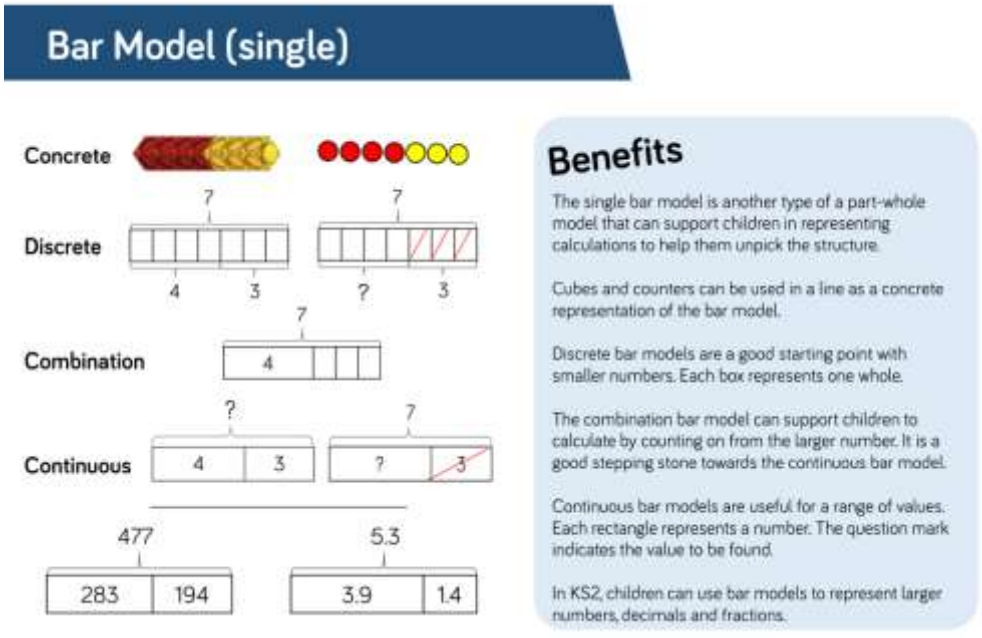
The Addition and Subtraction Calculation Policy

Included in this section is an overview of the models and images that are used within class to support the teaching of mathematics in Year 3. The full document is available on the school website.

Part-whole model

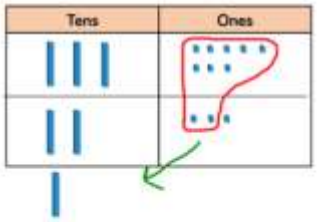


Bar model

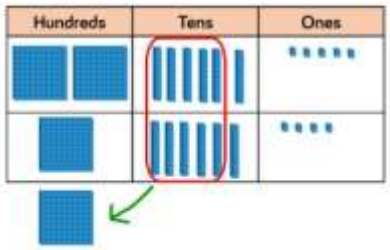


Base 10

Base 10/Dienes (addition)



$$\begin{array}{r} 38 \\ +\,23 \\ \hline 61 \\ \hline 1 \end{array}$$



$$\begin{array}{r} 265 \\ +\,164 \\ \hline 429 \\ \hline 1 \end{array}$$

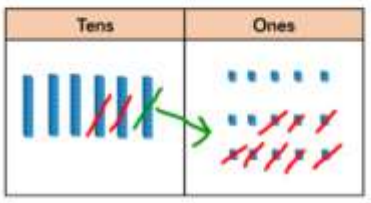
Benefits

Using Base 10 or Dienes is an effective way to support children's understanding of column addition. It is important that children write out their calculations alongside using or drawing Base 10 so they can see the clear links between the written method and the model.

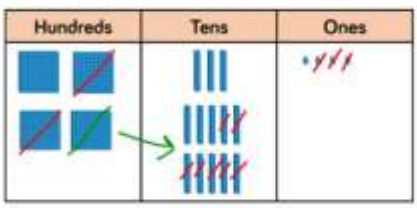
Children should first add without an exchange before moving on to addition with exchange. The representation becomes less efficient with larger numbers due to the size of Base 10. In this case, place value counters may be the better model to use.

When adding, always start with the smallest place value column. Here are some questions to support children.
How many ones are there altogether?
Can we make an exchange? (Yes or No)
How many do we exchange? (10 ones for 1 ten, show exchanged 10 in tens column by writing 1 in column)
How many ones do we have left? (Write in ones column)
Repeat for each column.

Base 10/Dienes (subtraction)



$$\begin{array}{r} {}^{5}\not{6}\,{}^{1}\not{5} \\ -\,28 \\ \hline 37 \end{array}$$



$$\begin{array}{r} {}^{3}\not{4}\,{}^{1}\not{3}5 \\ -\,273 \\ \hline 262 \end{array}$$

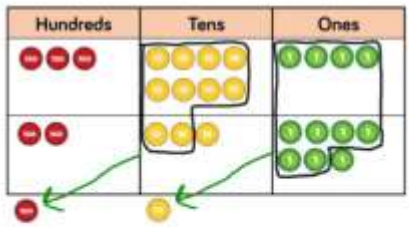
Benefits

Using Base 10 or Dienes is an effective way to support children's understanding of column subtraction. It is important that children write out their calculations alongside using or drawing Base 10 so they can see the clear links between the written method and the model.

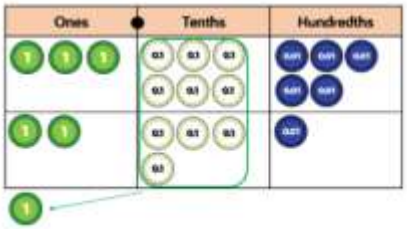
Children should first subtract without an exchange before moving on to subtraction with exchange. When building the model, children should just make the minuend using Base 10, they then subtract the subtrahend. Highlight this difference to addition to avoid errors by making both numbers. Children start with the smallest place value column. When there are not enough ones/tens/hundreds to subtract in a column, children need to move to the column to the left and exchange e.g. exchange 1 ten for 10 ones. They can then subtract efficiently.
This model is efficient with up to 4-digit numbers. Place value counters are more efficient with larger numbers and decimals.

Place Value Counters

Place Value Counters (addition)



$$\begin{array}{r} 384 \\ +\ 237 \\ \hline 621 \\ \hline {\scriptstyle 1\ 1} \end{array}$$



$$\begin{array}{r} 3.65 \\ +\ 2.41 \\ \hline 6.06 \\ \hline {\scriptstyle 1} \end{array}$$

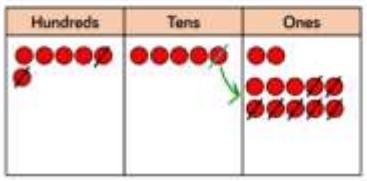
Benefits

Using place value counters is an effective way to support children's understanding of column addition. It is important that children write out their calculations alongside using or drawing counters so they can see the clear links between the written method and the model.

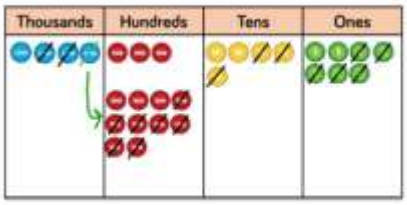
Children should first add without an exchange before moving on to addition with exchange. Different place value counters can be used to represent larger numbers or decimals. If you don't have place value counters, use normal counters on a place value grid to enable children to experience the exchange between columns.

When adding money, children can also use coins to support their understanding. It is important that children consider how the coins link to the written calculation especially when adding decimal amounts.

Place Value Counters (Subtraction)



$$\begin{array}{r} {\scriptstyle 4\ 1} \\ 6\not{5}2 \\ -\ 207 \\ \hline 445 \end{array}$$



$$\begin{array}{r} {\scriptstyle 3\ 1} \\ 4\not{3}57 \\ -\ 2735 \\ \hline 1622 \end{array}$$

Benefits

Using place value counters is an effective way to support children's understanding of column subtraction. It is important that children write out their calculations alongside using or drawing counters so they can see the clear links between the written method and the model.

Children should first subtract without an exchange before moving on to subtraction with exchange. If you don't have place value counters, use normal counters on a place value grid to enable children to experience the exchange between columns.

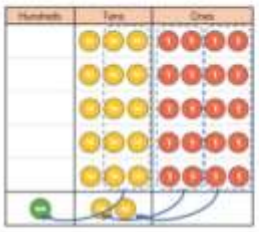
When building the model, children should just make the minuend using counters, they then subtract the subtrahend. Children start with the smallest place value column. When there are not enough ones/tens/hundreds to subtract in a column, children need to move to the column to the left and exchange e.g. exchange 1 ten for 10 ones. They can then subtract efficiently.

The Multiplication and Division Calculation Policy

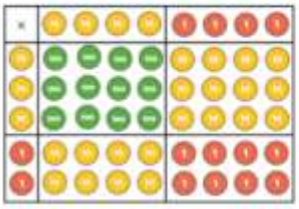
Included in this section is an overview of the models and images that are used within class to support the teaching of mathematics in Year 3. The full document is available on the school website.

Place Value Counters

Place Value Counters (multiplication)



$$\begin{array}{r} 34 \\ \times\ 5 \\ \hline 170 \\ \hline 1\ 2 \end{array}$$



$$\begin{array}{r} 44 \\ \times\ 32 \\ \hline 8 \\ 80 \\ 120 \\ +\ 1200 \\ \hline 1408 \\ \hline 1 \end{array}$$

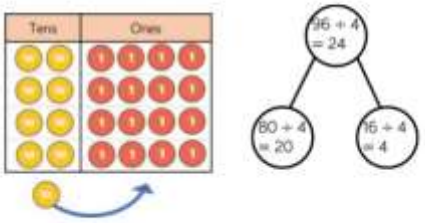
Benefits

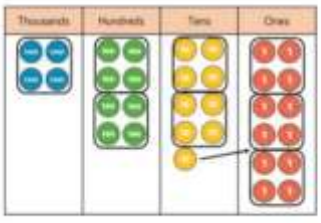
Using place value counters is an effective way to support children's understanding of column multiplication. It is important that children write out their calculation alongside the equipment so they can see how the concrete and written match.

As numbers become larger in multiplication or the amounts of groups becomes higher, Base 10 / Dienes becomes less efficient due to the amount of equipment and number of exchanges needed The counters should be used to support the understanding of the written method rather than support the arithmetic.

Place value counters also support the area model of multiplication well. Children can see how to multiply 2-digit numbers by 2-digit numbers.

Place Value Counters (division)





$$\begin{array}{r} 1223 \\ 4\overline{)4892^{1}} \end{array}$$

Benefits

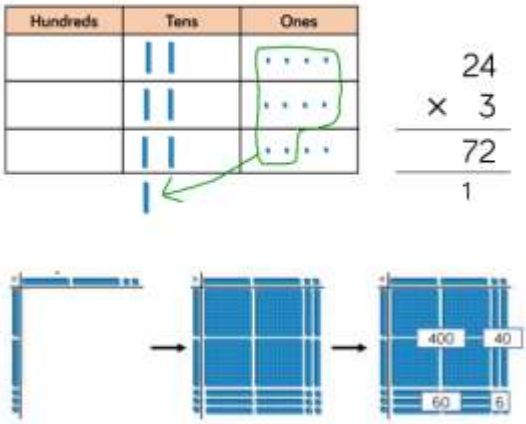
Using place value counters is an effective way to support children's understanding of division.

When working with smaller numbers, children can use place value counters to share between groups. They start by sharing the larger place value column and work from left to right. If there are any counters left over once they have been shared, they exchange the counter e.g. exchange one ten for ten ones. This method can be linked to the part-whole model to support children to show their thinking.

Place value counters also support children's understanding of short division by grouping the counters rather than sharing them. Children work from left to right through the place value columns and group the counters in the number they are dividing by. If there are any counters left over after they have been grouped, they exchange the counter e.g. exchange one hundred for ten tens.

Base 10

Base 10/Dienes (multiplication)



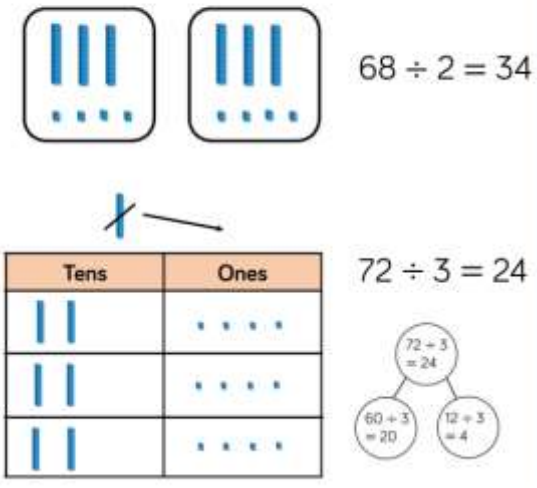
Benefits

Using Base 10 or Dienes is an effective way to support children's understanding of column multiplication. It is important that children write out their calculation alongside the equipment so they can see how the concrete and written representations match.

As numbers become larger in multiplication or the amounts of groups becomes higher, Base 10 / Dienes becomes less efficient due to the amount of equipment and number of exchanges needed.

Base 10 also supports the area model of multiplication well. Children use the equipment to build the number in a rectangular shape which they then find the area of by calculating the total value of the pieces This area model can be linked to the grid method or the formal column method of multiplying 2-digits by 2-digits.

Base 10/Dienes (division)



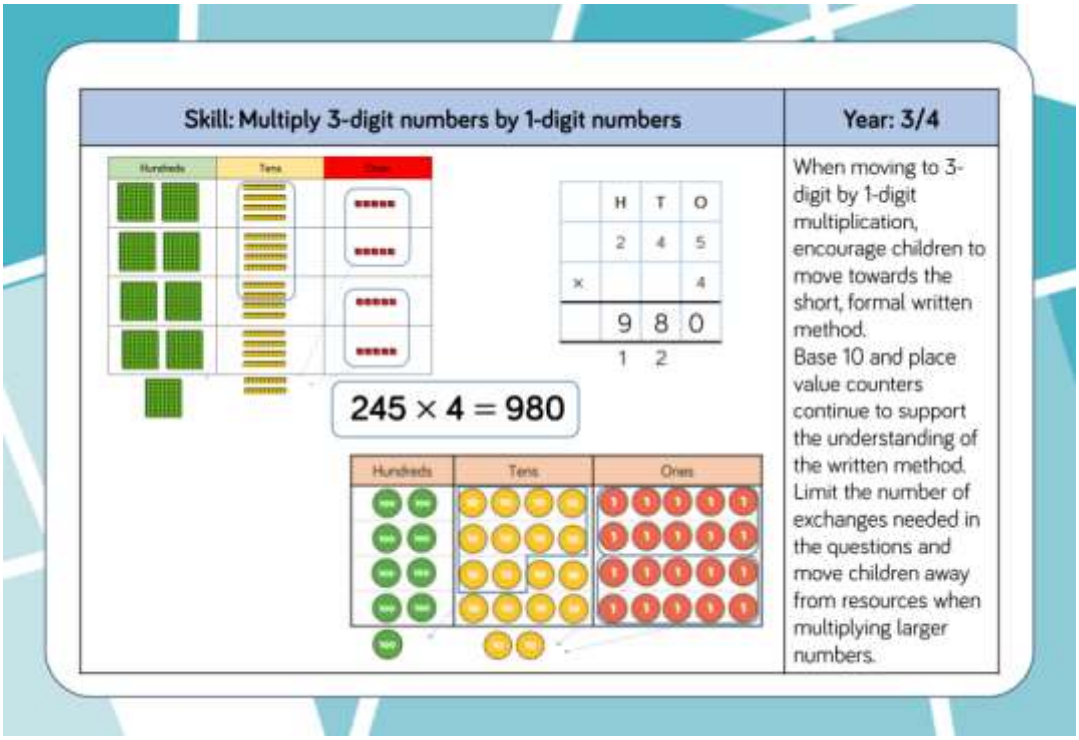
Benefits

Using Base 10 or Dienes is an effective way to support children's understanding of division.

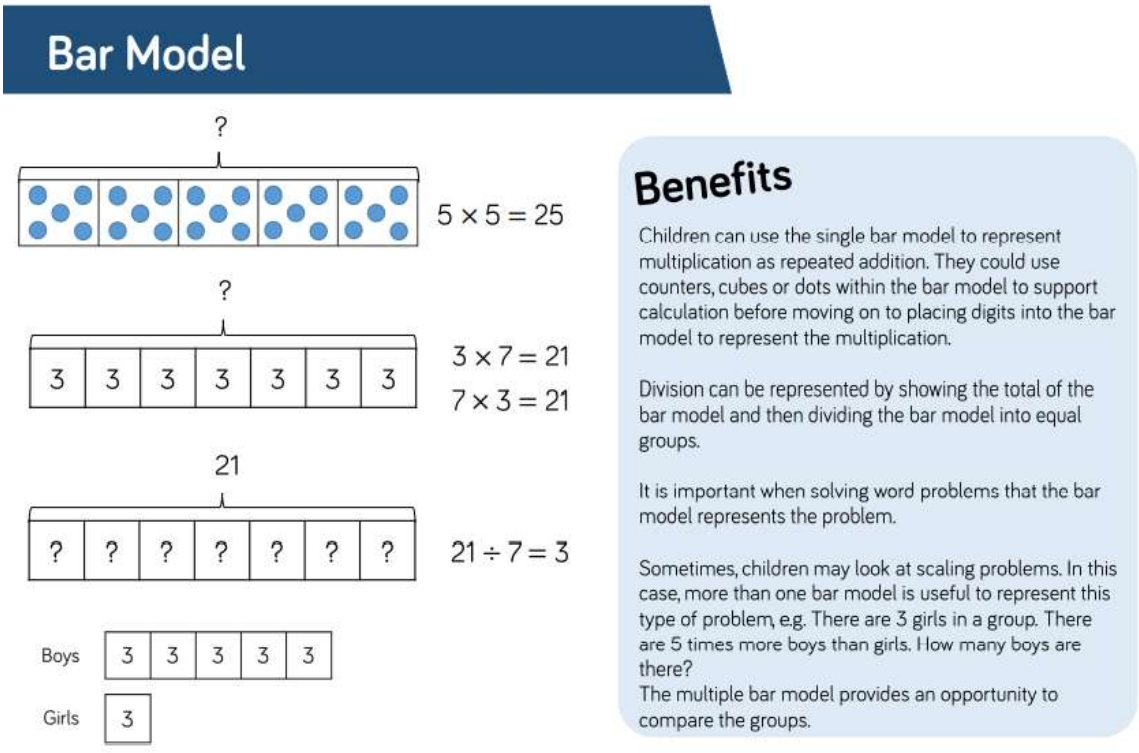
When numbers become larger, it can be an effective way to move children from representing numbers as ones towards representing them as tens and ones in order to divide. Children can then share the Base 10/ Dienes between different groups e.g. by drawing circles or by rows on a place value grid.

When they are sharing, children start with the larger place value and work from left to right. If there are any left in a column, they exchange e.g. one ten for ten ones. When recording, encourage children to use the part-whole model so they can consider how the number has been partitioned in order to divide. This will support them with mental methods.

Short Written Method



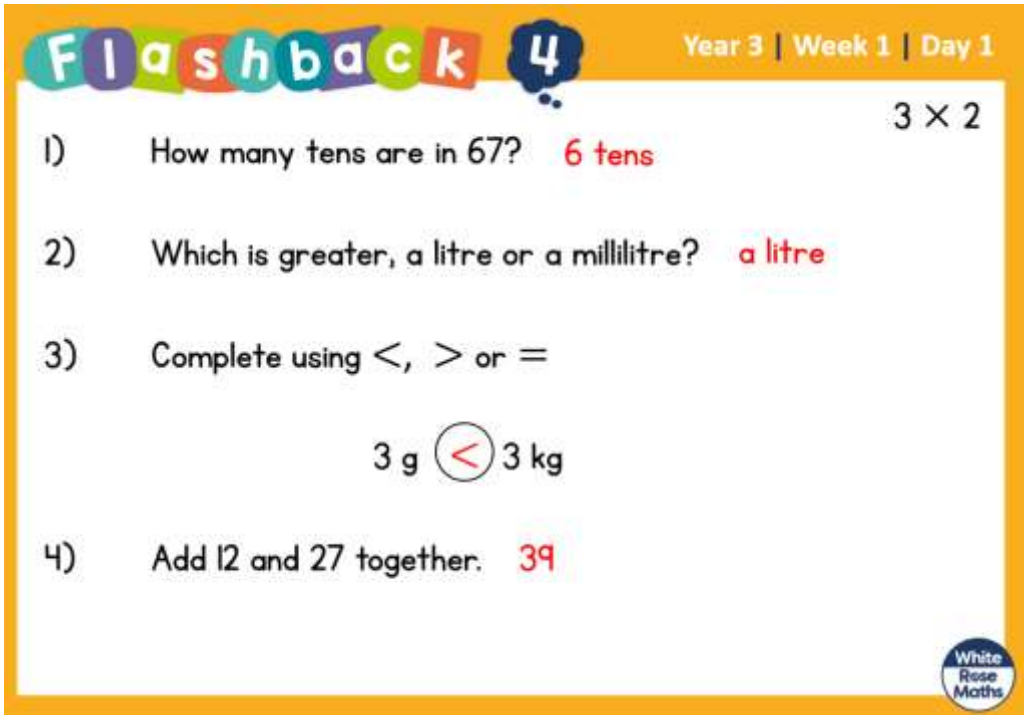
Bar Model



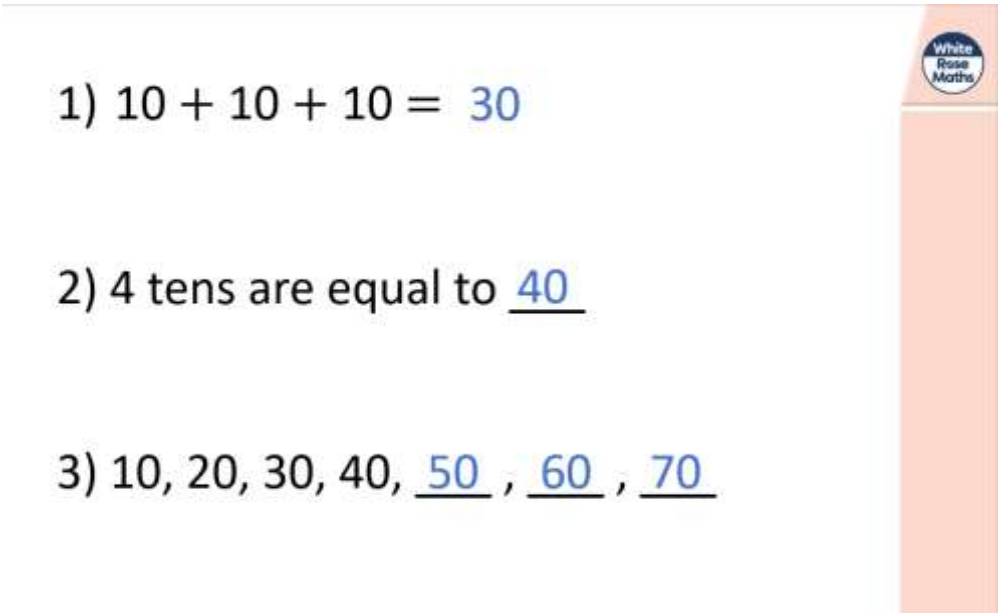
Year 3 Mathematics – Reinwood Junior School

A Year 3 Sample Mathematics Lesson

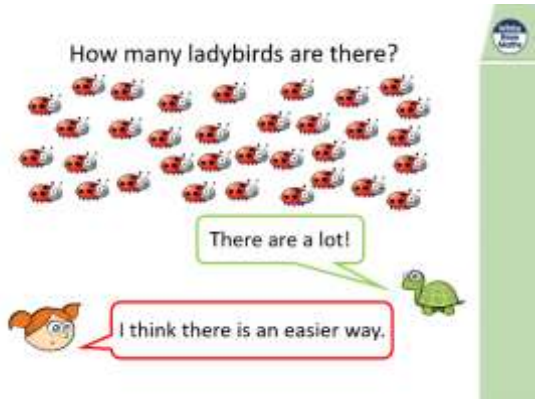
Each lesson begins with a 'Flashback 4'. This is a set of questions for the children to complete at the start of each lesson to recap previous learning.

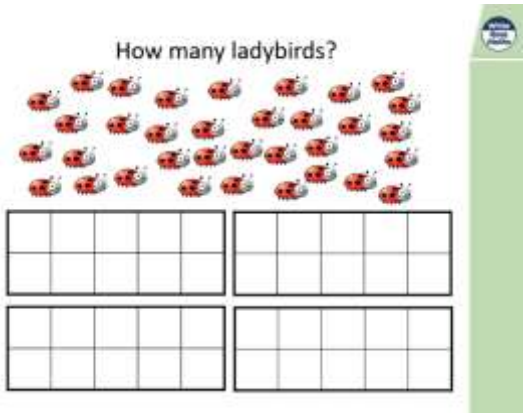


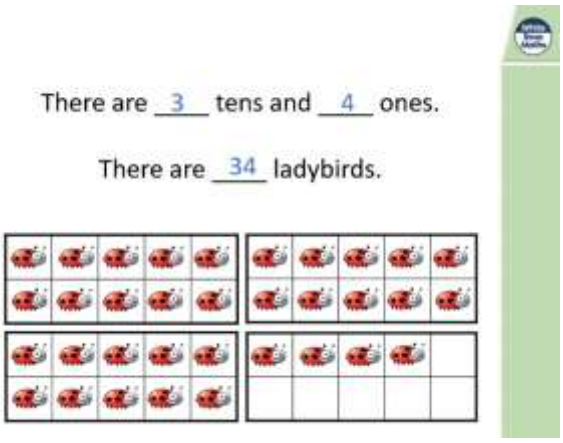
The children will then work through 'Get Ready' questions. This allows the teacher to assess the children's knowledge and also to provide the children will some of the skills needed for the next part of the lesson.

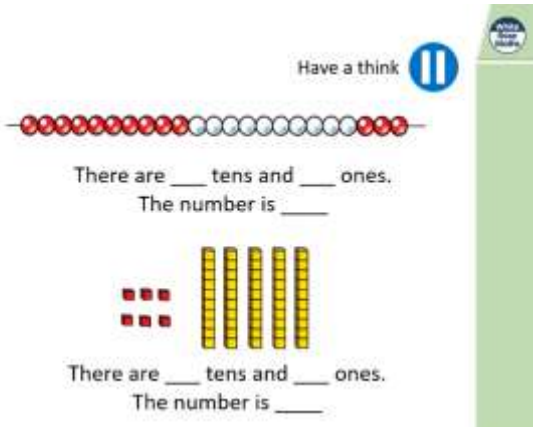


The teacher will then deliver the main 'input' part of the lesson to equip the children with the knowledge and skills needed for their main task.

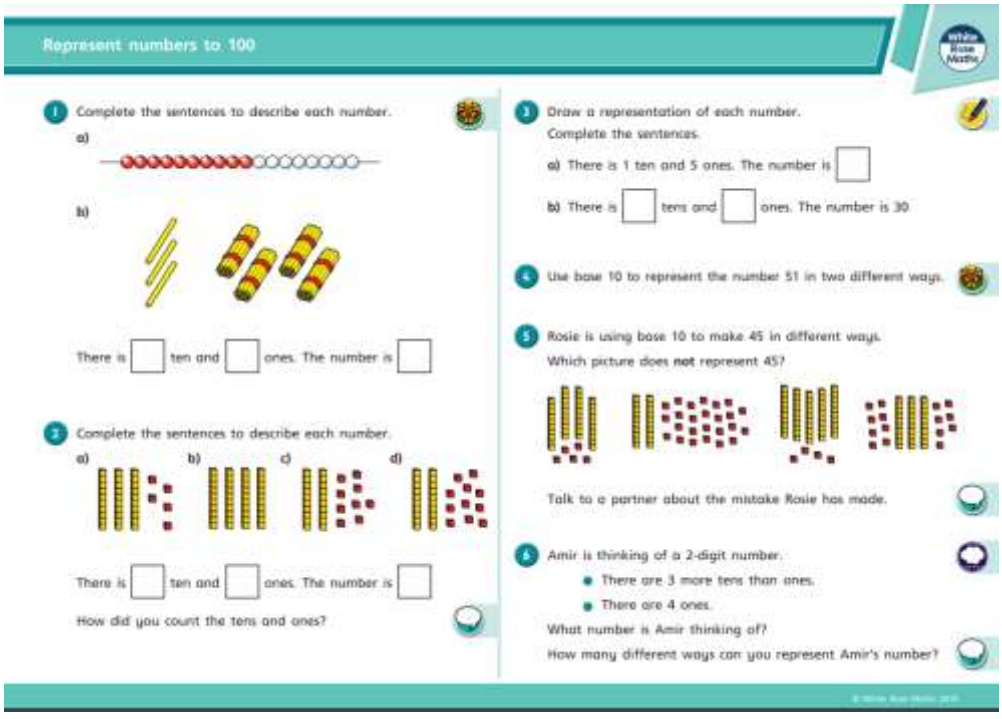




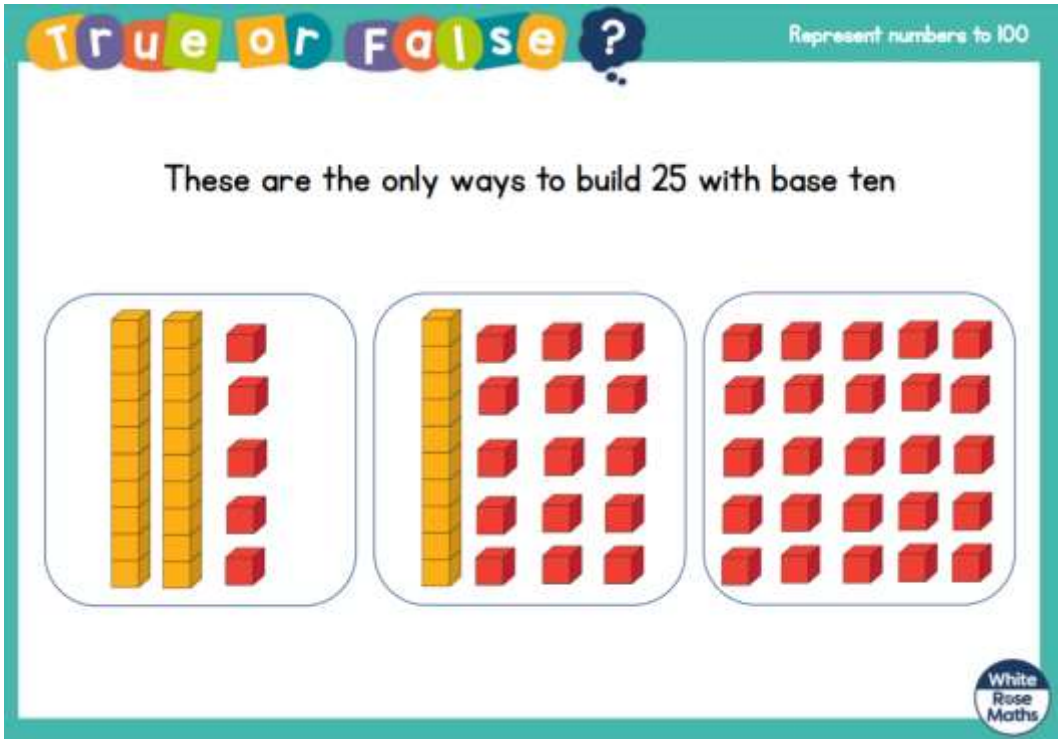




The children will then begin their main task in their books, working through the tasks, sometimes this will be independently.



The lesson will end with a 'True or False' question to deepen and check the children's understanding.



Year 3 Mathematics – Reinwood Junior School

Timestables at Reinwood Junior School

The National Curriculum requires children to know all their times tables up to 12 x 12 by the end of year 4 when they take their Multiplication Tables Check. Times tables are taught in school using games, songs and other interactive activities including Times Table Rockstars. The new scheme we are introducing works alongside our current practice to consolidate and embed times table knowledge.

Children will complete a 5 minute times table challenge, working through a bronze, silver and gold level for each times table. When the children have earned all their bronze awards, they will move onto silver and then gold. To move onto the next times table or award, the children will need to get every question correct on the challenge; this means that lots of children within the class will be working on different times tables at different times. As children work through silver and gold challenges, questions will become trickier and include inverses, missing numbers, division and worded problems. On Fridays the challenge will take place, on Mondays any corrections (if there are any) will be completed and then their challenge sheet will be sent home so that you can see which times table your child is working on.

Year 3 Times Table Challenge

Bronze Award
Children achieve this award when they can answer random **multiplication** questions about a chosen times table.
Examples:
5 times 3 =
4 lots of 3 =
The product of 5 and 3 =

Silver Award
Children achieve this award when they can answer random **multiplication and division** questions about a chosen times table.
Examples:
24 ÷ 3 = 8 24 ÷ 8 = 3 8 x 3 = 24

Gold Award
Children achieve this award when they can answer word problems related to a chosen times table:

There are 6 eggs in a box. I have 3 boxes. How many eggs do I have altogether?

I have a bag of 30 sweets and I share them equally between 5 friends. How many sweets does each friend get?

Children are expected to know certain times tables by the end of a specific year group. The grid below shows the minimum expectations.
Each times table should be learnt up to 12 times each number, for example: 12 x 3 or 12 x 4.

2x	3x	4x	5x	6x	7x	8x	9x	10x	11x	12x
Year 2	Year 3	Year 3	Year 2	Year 3	Year 4	Year 4	Year 4	Year 2	Year 5	Year 5

To gain each award the children have to correctly answer twenty questions in 5 minutes.

By themselves:

1) Read the table over and over.

2) Cover the table and chant it out loud or in your mind e.g. 1 times 3 equals 3, 2 times 3 equals 6 ...

3) Listen to times table songs

4) Write themselves random questions, then answer them as quickly as they can.

Ways to help your child learn their times tables:

With an adult or friend:

1) Chant the times table together.

2) Write out the timetables in order with some numbers missing. Can you guess the missing number?

3) Ask each other questions like:
What is 6 times 4?
Multiply 6 by 3.
How many threes make 33?
Share 21 between 3.

Year 3 Mathematics – Reinwood Junior School

KIRFs (Key Instant Recall Facts)

KIRFs (Key Instant Recall Facts) are designed to support the development of the mental skills that underpin much of the mathematics work in school. They are particularly useful when calculating, be it adding, subtracting, multiplying or dividing.

Key Instant Recall Facts

	Year 3	Year 4	Year 5	Year 6	Year 6 **CHALLENGE**
Autumn 1	Know all number bonds for each number to 20	Know all number bonds to 100	Know all decimals that total 1 or 10 (1 decimal place)	Know all previous number bonds including decimals	Know the two place decimal complements of 1
Autumn 2	Know multiplication and division facts for 5x and 10x tables	Know multiplication and division facts for the 7x and 8x tables	Consolidate multiplication and division facts for all times tables	Use all multiplication and division facts for the times tables up to 10x10, to derive x and ÷ of decimals numbers	Use place value and all multiplication and division facts for the times tables up to 10x10, to derive x and ÷ of small multiples of 10 and 100 (e.g. 30 x 900; 8100 ÷ 9)
Spring 1	Know multiplication and division facts for 2x and 4x tables	Know all 2-digit pairs that total 100	Know the doubles and halves of all two-digit numbers	Know doubles and halves of 2-digit decimals	Know the prime numbers within 50
Spring 2	Know doubles and halves of: All whole numbers to 20 All multiples of 10 to 500 All multiples of 100 to 5000	Know doubles and halves of: All whole numbers to 50 All multiples of 5 to 1000 All multiples of 50 to 5000	Know doubles and halves of: All whole numbers to 100 All multiples of 10 to 1000 All multiples of 100 to 10,000	Know the doubles and halves of all multiples of 10 to 10000	Know the doubles and halves of all multiples of 1000 to 100000
Summer 1	Know all addition and subtraction facts for: Multiples of 100 to 1000 Multiples of 5 with a total of 100 Number pairs that total 100	Know all pairs of multiples of 50 with a total of 1000	Know all pairs of factors of numbers up to 100	Know the tests for divisibility for 4 and 6	Know the decimal and percentage equivalents of the fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{3}$, $\frac{2}{3}$, tenths and fifths
Summer 2	Know all multiplication and division facts for 3x, 6x and 9x table	Know all multiplication and division facts for all tables up to 10 x 10	Know the tests for divisibility for 2,3,5,9 and 10	Know square numbers to 12 x 12	Know the square roots of square numbers to 15 x 15

Glossary of Terms

Glossary

Addend - A number to be added to another.

Aggregation - combining two or more quantities or measures to find a total.

Augmentation - increasing a quantity or measure by another quantity.

Commutative – numbers can be added in any order.

Complement – in addition, a number and its complement make a total e.g. 300 is the complement to 700 to make 1,000

Difference – the numerical difference between two numbers is found by comparing the quantity in each group.

Exchange – Change a number or expression for another of an equal value.

Minuend – A quantity or number from which another is subtracted.

Partitioning – Splitting a number into its component parts.

Reduction – Subtraction as take away.

Subitise – Instantly recognise the number of objects in a small group without needing to count.

Subtrahend - A number to be subtracted from another.

Sum - The result of an addition.

Total – The aggregate or the sum found by addition.

Array – An ordered collection of counters, cubes or other item in rows and columns.

Commutative – Numbers can be multiplied in any order.

Dividend – In division, the number that is divided.

Divisor – In division, the number by which another is divided.

Exchange – Change a number or expression for another of an equal value.

Factor – A number that multiplies with another to make a product.

Multiplicand – In multiplication, a number to be multiplied by another.

Partitioning – Splitting a number into its component parts.

Product – The result of multiplying one number by another.

Quotient – The result of a division

Remainder – The amount left over after a division when the divisor is not a factor of the dividend.

Scaling – Enlarging or reducing a number by a given amount, called the scale factor