St. Leonard's CE Primary School Calculation Policy KS1

Safeguarding Children In Banbury

About St. Leonard's Calculation Policy

The following calculation policy has been devised to meet requirements of the National Curriculum 2014 for the teaching and learning of mathematics; it is also designed to give pupils a consistent and smooth progression of learning in calculations across the school.

Age stage expectations:

The calculation policy is organised according to age stage expectations as set out in the National Curriculum 2014 and the method(s) shown for each year group should be modelled to the vast majority of pupils. Pupils are taught according to the pathway that they are currently working at and are showing to have 'mastered' a pathway before moving on to the next one. Of course, pupils who are showing to be secure in a skill can be challenged to the next pathway as necessary.

Maths Mastery:

At the centre of the mastery approach to the teaching of mathematics is the belief that **all children have the potential to succeed**. They should have access to the same curriculum content and, rather than being extended with new learning, they should **deepen their conceptual understanding by tackling challenging and varied problems**. Similarly, with calculation strategies, children must not simply rote learn procedures but demonstrate their understanding of these procedures through the use of concrete materials and pictorial representations. This policy outlines the different calculation strategies that should be taught and used in Year 1 to Year 6 in line with the requirements of the 2014 Primary National Curriculum.

Safeguarding Children In Banbury

About St. Leonard's Calculation Policy

Mathematical Language:

The 2014 National Curriculum is explicit in articulating the importance of children using the correct mathematical language as a central part of their learning (*reasoning*). Indeed, in certain year groups, the non-statutory guidance highlights the requirement for children to extend their language around certain concepts. It is therefore essential that teaching using the strategies outlined in this policy is accompanied by the use of appropriate and precise mathematical vocabulary. New vocabulary should be introduced in a suitable context (for example, with relevant real objects, apparatus, pictures or diagrams) and explained carefully. High expectations of the mathematical language used are essential, with teachers only accepting what is correct.

How to use the policy:

This calculation policy is a guide for all staff and parents of St Leonard's Primary school and has been adapted from work by PiXL. It is expected that teachers will use their professional judgement as to when consolidation of existing skills is required or if to move onto the next concept. However, the **focus must always remain on breadth and depth rather than accelerating through concepts.** Children should not be extended with new learning before they are ready, they should deepen their conceptual understanding by tackling challenging and varied problems.
Teachers can use any teaching resources that they wish to use and the policy does not recommend one set of resources over another, rather that, a variety of resources are used. The principle of the concrete-pictorial-abstract (CPA) approach [Make it, Draw it, Write it] is for children to have a true understanding of a mathematical concept.

Safeguarding Children In Banbury

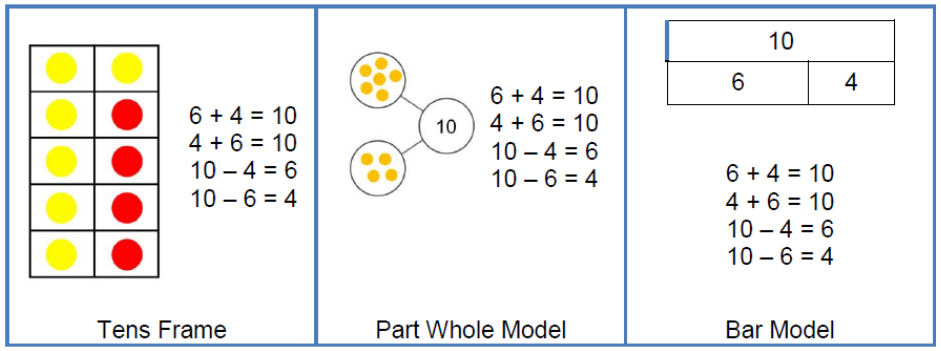
Addition: Year One

Year 1 statutory requirements :

- ✓ Count to and across 100, forwards beginning with 0 or 1, or from any given number.
- ✓ Given a number, identify one more.
- ✓ Read, write and interpret mathematical statements involving addition (+), and equals (=) signs.
- ✓ Represent and use number bonds and related subtraction facts within 20
- ✓ Add one-digit and two-digit numbers to 20, including zero.
- ✓ Solve one-step problems that involve addition using concrete objects and pictorial representations, and missing number problems.

Identify and represent numbers using objects and pictorial representations (multiple representations)

Memorise and reason with number bonds to 10 and 20 in several forms.

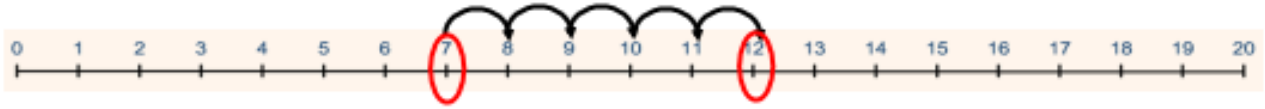


Count on in ones to and across 100 and find one more than a given number.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

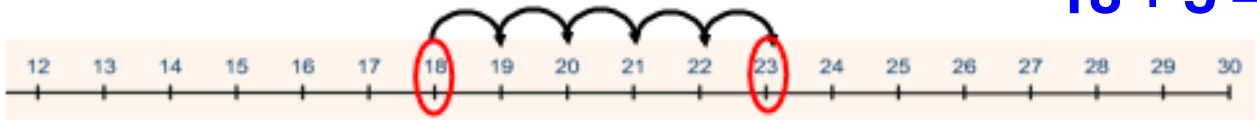
Addition: Year One

Use concrete resources and a number line to support the addition of numbers. Know and use strategy of finding the larger number, and counting on in ones from this number.



1 digit + 1 digit

7 + 5 = 12



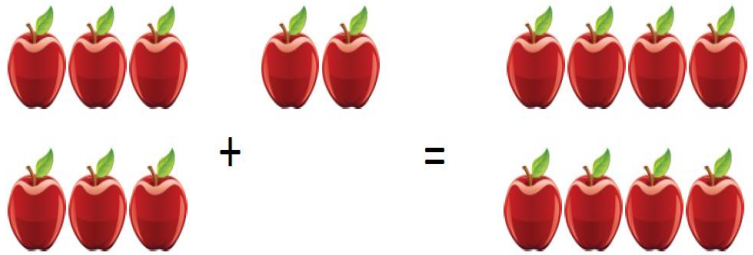
2 digit + 1 digit

18 + 5 = 23

Begin to use the + and = signs to write calculations in a number sentence.

Solve one-step problems using concrete objects and pictorial representations.

Tom picks 6 apples and Raj picks 2 apples.
How many apples do they have altogether?



Safeguarding Children In Banbury

Addition: Year Two

Year 2 statutory requirements :

✓ Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts to 100.

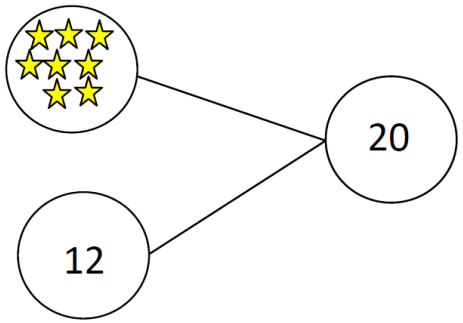
✓Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

✓ Add numbers using concrete objects, pictorial representations, and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers
- adding three one-digit numbers.

✓ Solve problems with addition including those involving numbers, quantities and measures.

Memorise and reason with number facts to 20 in several forms.



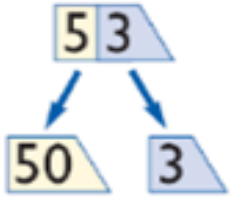
8 + 12 = 20

12 + 8 = 20

20 – 12 = 8

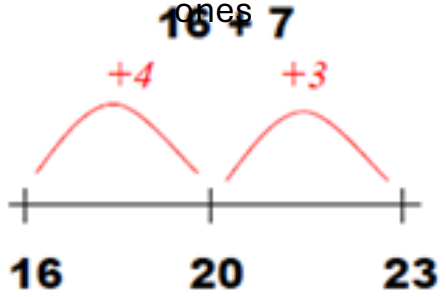
20 – 8 = 12

Partition two 2-digit numbers using a variety of models and images.

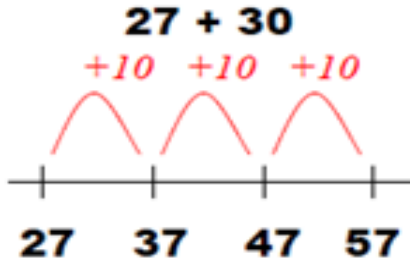


Addition: Year Two

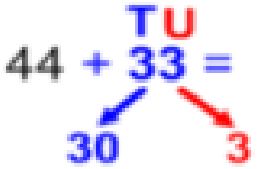
Add 2 digit number and ones

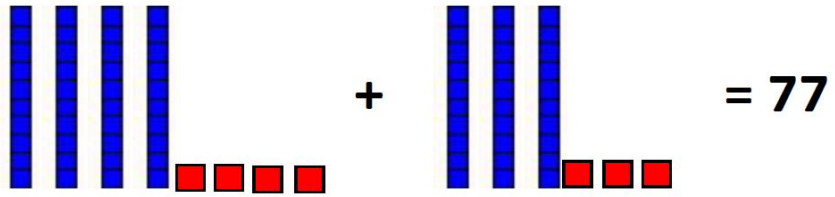


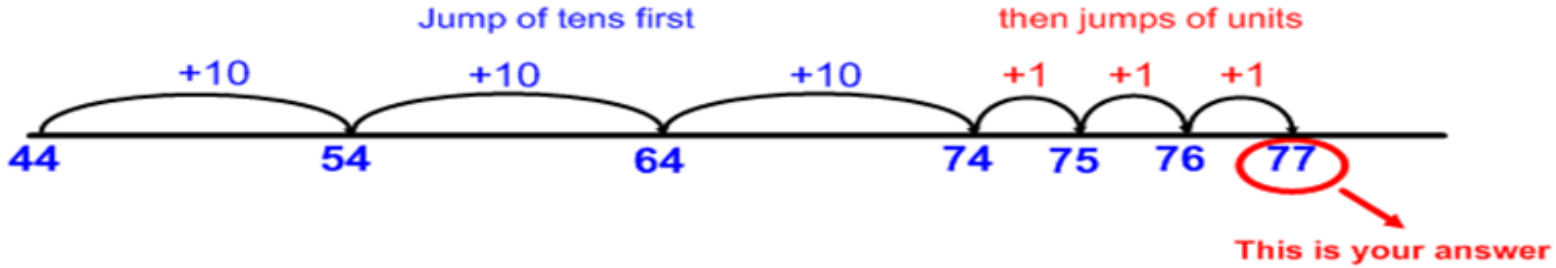
Add 2 digit number and tens



Use partitioning to add two 2-digit numbers using concrete resources and/or a numbered number line and then progressing to an empty number line.







As children gain confidence with adding on tens and ones, they should be taught to combine the jumps on an empty number line.

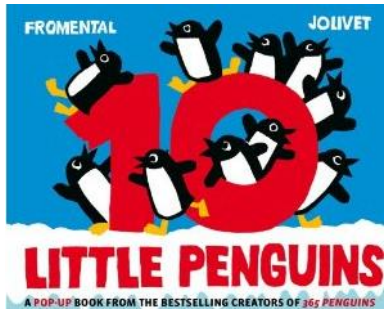
Safeguarding Children In Banbury

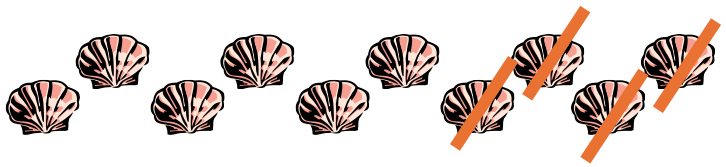
Subtraction: Year One

Year 1 statutory requirements:

- ✓ Say which number is one less than a given number.
- ✓ Represent and use number bonds and related subtraction facts within 20.
- ✓ Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs.
- ✓ Subtract one-digit and two-digit numbers to 20, including zero.
- ✓ Solve one-step problems that involve subtraction using concrete objects and pictorial representations, and missing number problems.

Understand subtraction as take away. Use practical resources, pictorial representations, role play, stories and rhymes.

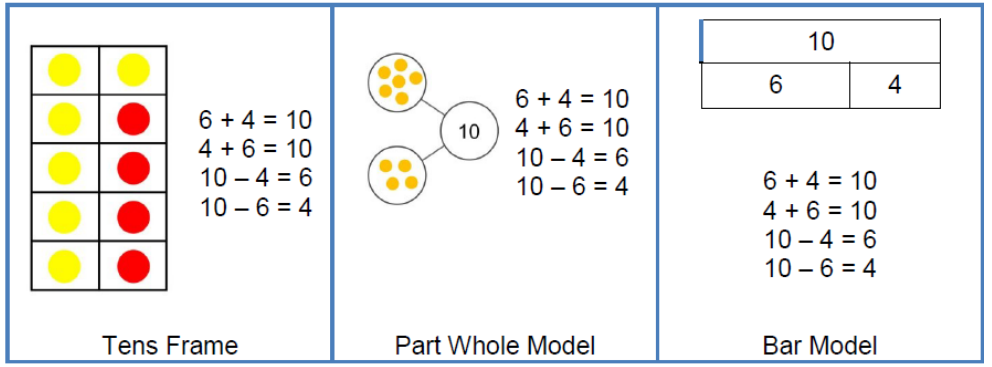




Use number bonds and related subtraction facts within 20.

16 – ☐ = 10

20 – ☐ = 15



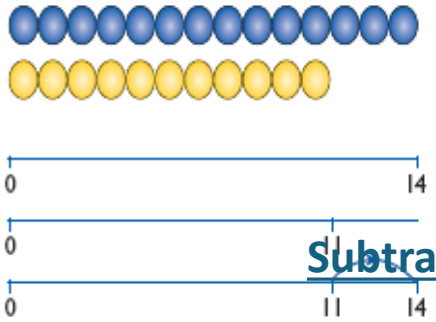
Count back in ones and find one less than a given number.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Safeguarding Children In Banbury

Subtraction: Year One

Counting on should only be used when the language used is 'find the difference', 'difference between' and 'distance between'.



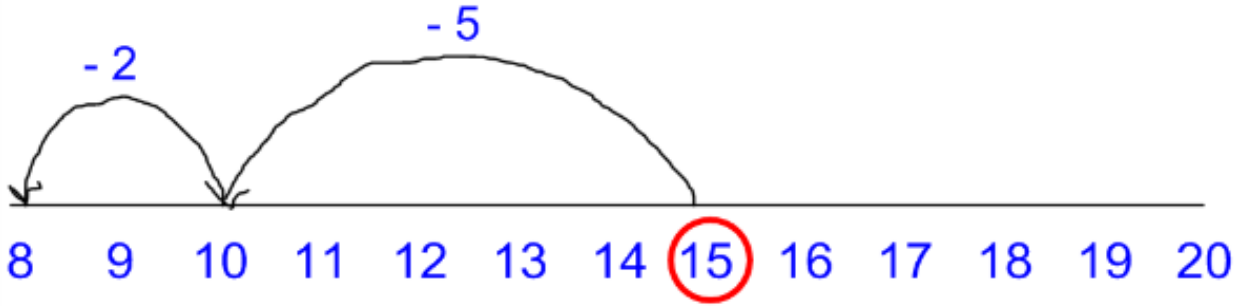
The difference between 11 and 14 is 3.

14 – 11 = 3

11 + ☐ = 14

Subtraction: Year One

Use number line to support the subtraction of numbers. Know and use strategy of **counting back** to subtract one-digit and two-digit numbers to 20.



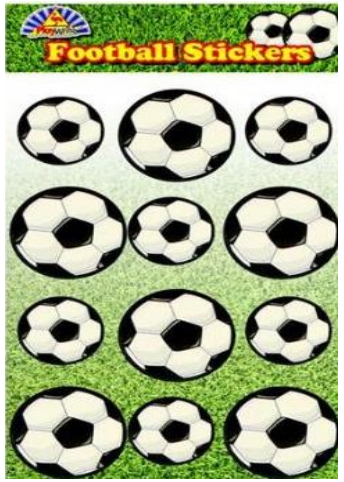
15 – 7 = 8

Solve one-step problems using concrete objects and pictorial representations.

Dan has 12 football stickers.

He gives 4 to Ben.

How many stickers does he have left?



12 - 4 = 8

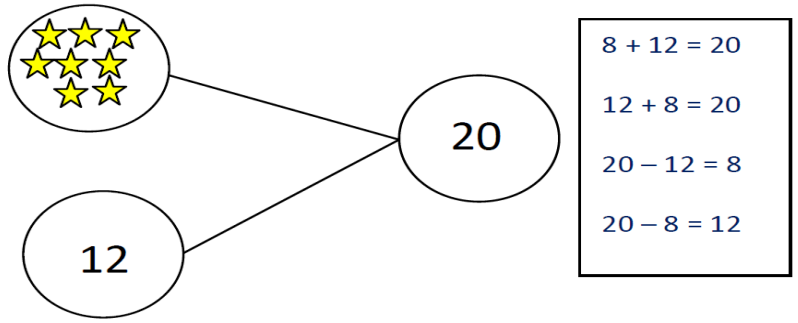
Begin to use the - and = signs to write calculations in a number sentence.

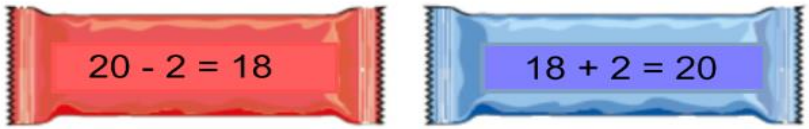
Subtraction: Year Two

Year 2 statutory requirements:

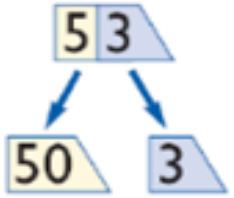
- Recall and use subtraction facts to 20 fluently, and derive and use related facts to 100.
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
- Subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers.

Memorise and reason with number facts to 20 in several forms.





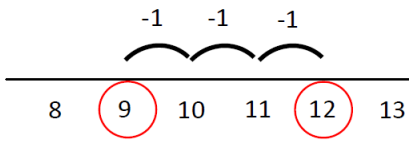
Partition two 2-digit numbers using a variety of models and images.



Subtraction: Year Two

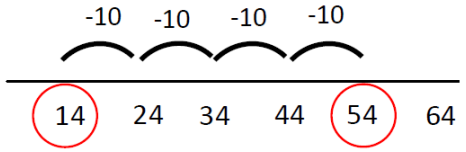
Subtract 2 digit and ones

12 – 3

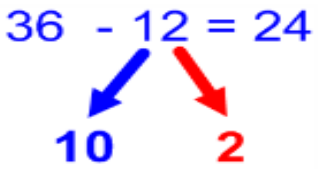


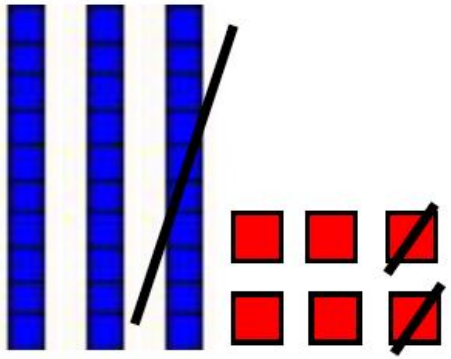
Subtract 2 digit and tens

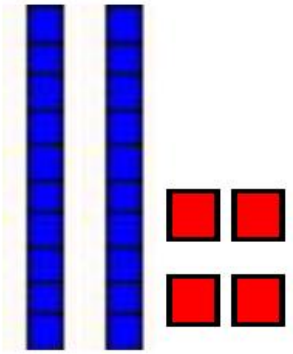
54 – 40



Use partitioning to subtract two 2-digit numbers using concrete resources and/or a numbered number line and then progressing to an empty number line.







36 - 12	=	24

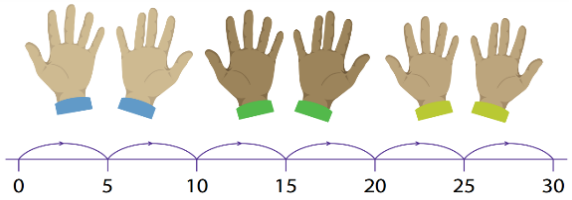
OR

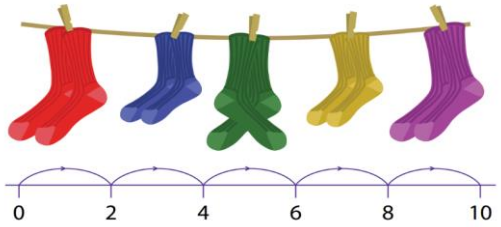
Safeguarding Children In Banbury

Multiplication: Year One

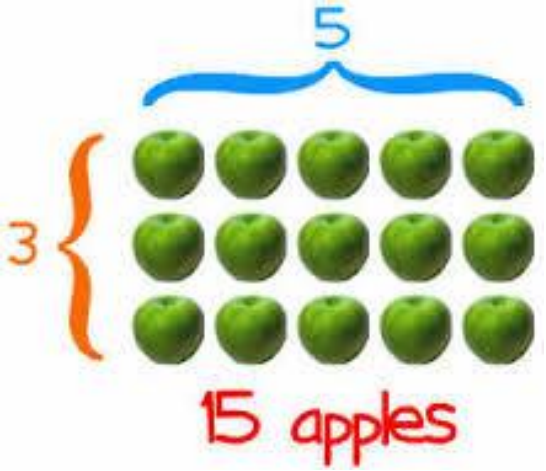
Year 1statutory requirement:
✓Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support
of the teacher.

Count in twos, fives and tens using practical resources, role play, stories and songs.





Use arrays



Understand multiplication as repeated addition – use concrete objects to support understanding.

2 + 2 + 2 + 2

5 + 5 + 5
or
3 x 5

Use pictorial representations

3 x 5

3 groups of 5

Safeguarding Children In Banbury

Multiplication: Year Two

Year 2 statutory requirement:
✓Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
✓Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs.
✓Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
✓Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Further develop understanding multiplication as repeated addition.

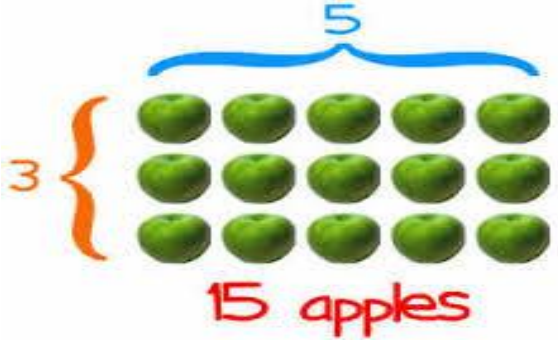
5 + 5 + 5
or
5 x 3

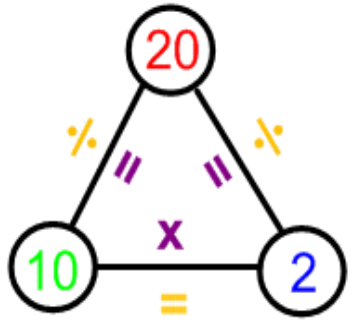
Use pictorial representations

3 x 5

3 groups of 5

Use arrays

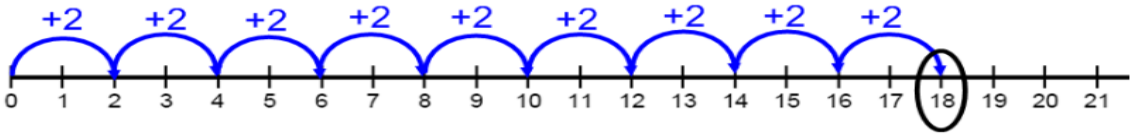




Recall multiplication and division facts for 2, 5, 10

Model and bridge link from repeated addition to solving multiplication problems using a number line.

9 groups of 2 = 18
9 jumps of 2 = 18
9 x 2 = 18



Safeguarding Children In Banbury

Division: Year One

Year 1 statutory requirement:

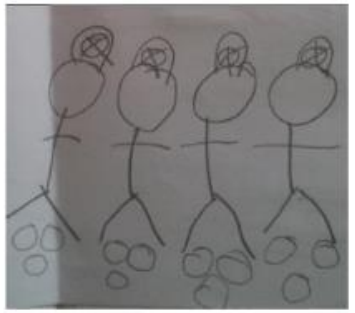
- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Understand division as **sharing** using concrete resources.

Pictorial representation of sharing **12 gold coins** between 2, 3 and 4 pirates!

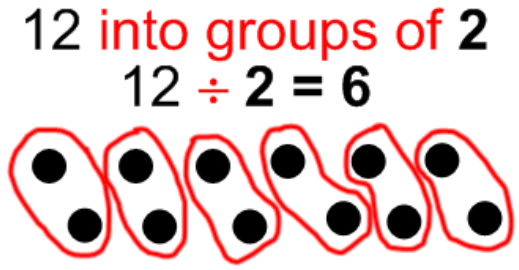
12 ÷ 2

12 ÷ 3



12 ÷ 4

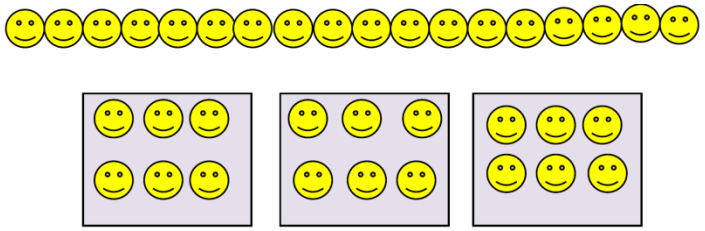
Begin to understand division as **grouping** using concrete resources.



Division: Year Two

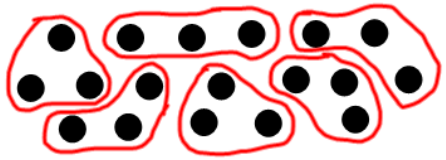
Year 2 statutory requirement:
✓Recall and use division facts for 2, 5 and 10 multiplication tables.
✓Calculate mathematical statements for multiplication and division within the multiplication tables and write then using the multiplication (x), division ( ) and equals (=) signs.
✓Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
✓***Find 1/3; 1/4; 2/4; ¾ of a length, shape, set of objects or quantity***

Further develop understanding of difference between **sharing and grouping** using concrete resources.

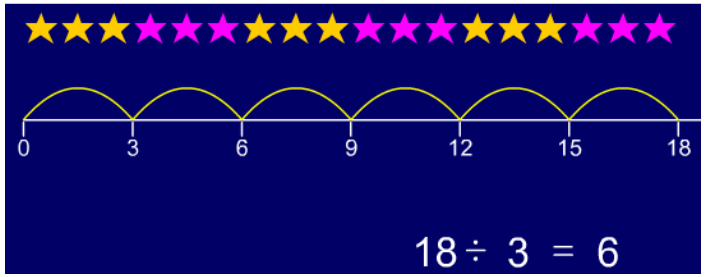


18 smiley faces shared between 3 classes.

18 into groups of 3
18 ÷ 3 = **6**

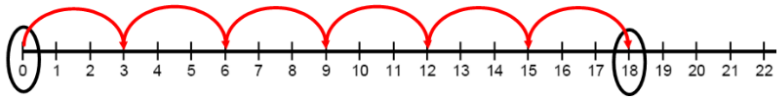


Model division as grouping on a number line (ITP 'Grouping')

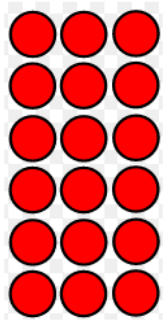


Children use numbered number lines to divide using grouping.

18 into groups of 3 = 6 groups
18 into jumps of 3 = 6 jumps
18 ÷ 3 = 6



Reinforce division through the use of arrays.



18 ÷3 = 6

18 ÷6 = 3

Remember to develop connections between fractions and division and rephrase this calculation as 1/3 of 18 is the same as 18 ÷ 3 = 6.

Safeguarding Children In Banbury