

Y1 mathematics workshop



Aims of today

- To learn about how we teach maths and the resources we use
- To understand the key objectives for Y1
- To focus on developing fluency of addition and subtraction facts
- How to help at home, including interactive games

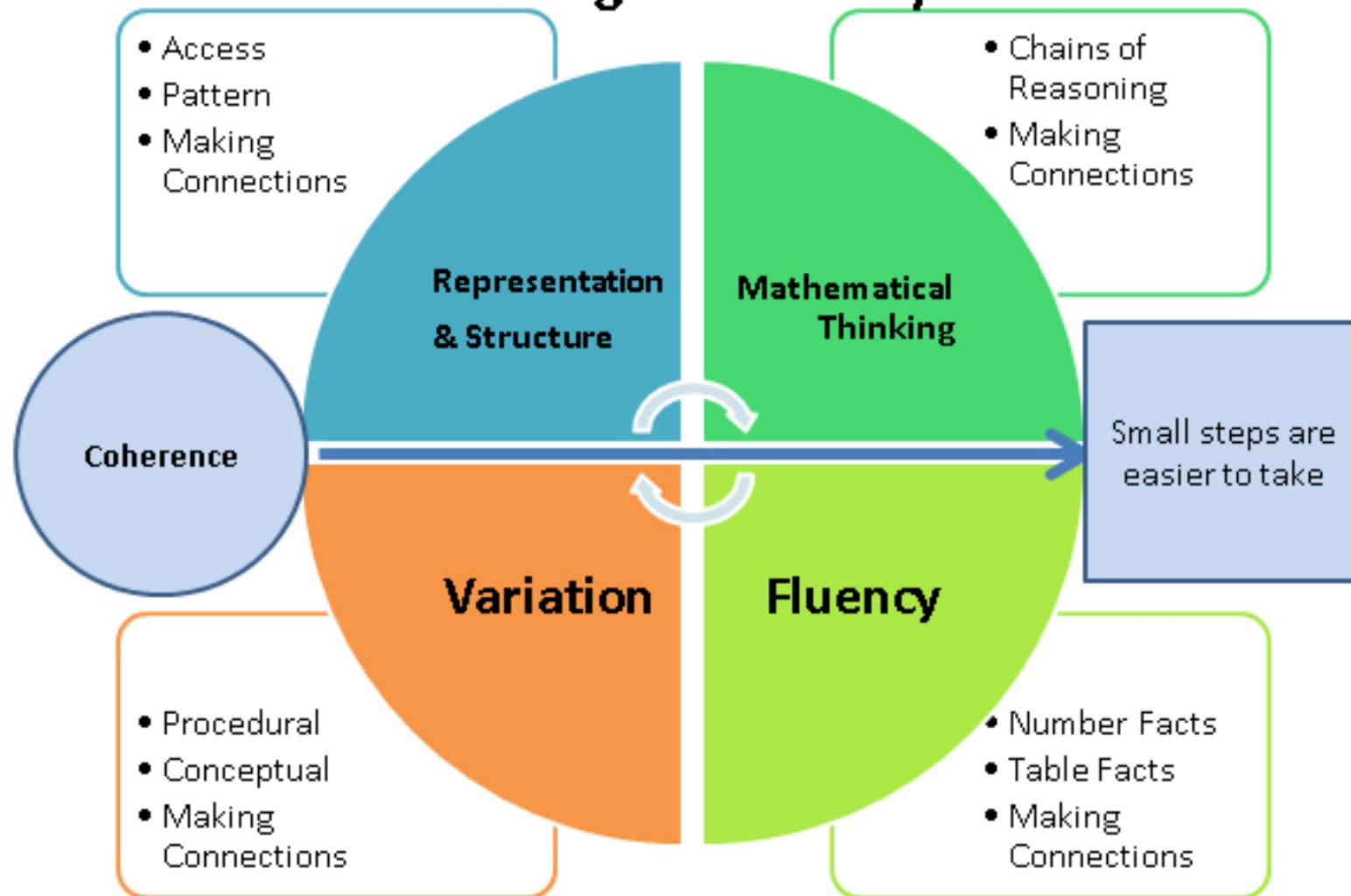


The maths mastery approach

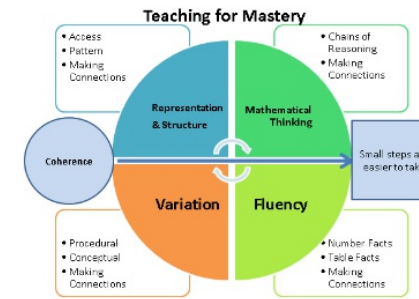


The five big ideas

Teaching for Mastery



Representation and structure



Concrete – Pictorial – Abstract

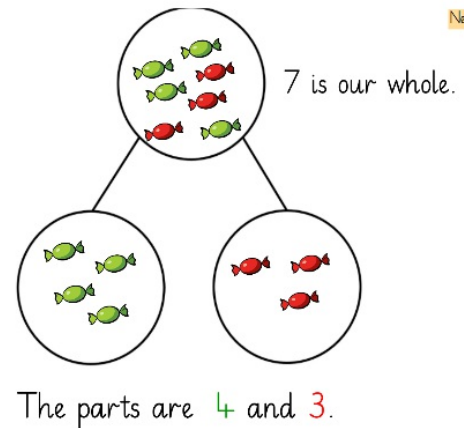
The representation needs to pull out the concept being taught and in particular difficult points. It exposes the structure.

Eventually, the children need to be able to do the maths without the representation. We want to help children move to the abstract.



Representation and structure

Concrete – Pictorial – Abstract



The whole is 5.
The parts are 2
and 3.
 $5 = 2 + 3$

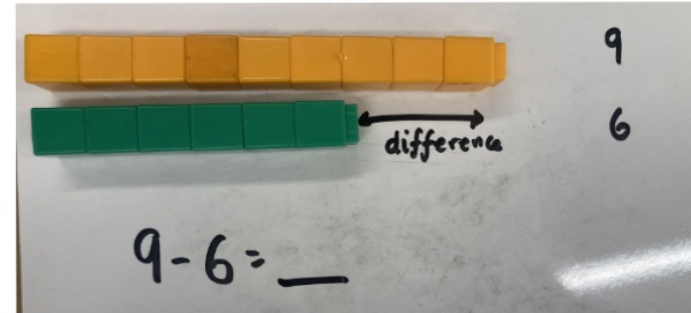
Contexts and representations are carefully chosen to develop reasoning skills and to help pupils link concrete ideas to abstract mathematical concepts.



diennes



bead string

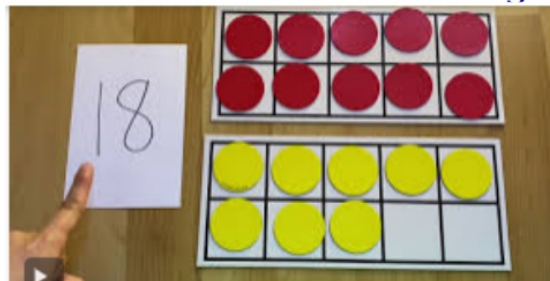


unifix

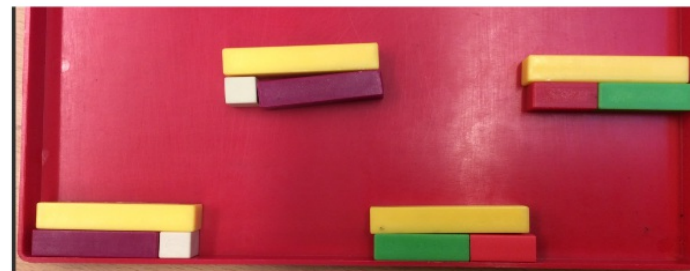


numicon

counters tens frame



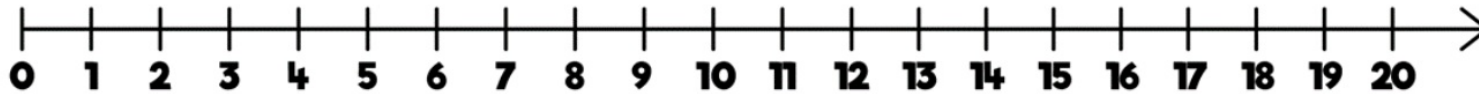
Cuisenaire rods



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

number square

number line



blank number line $20 + 10 = 30$
 $30 + 1 + 1 = 32$

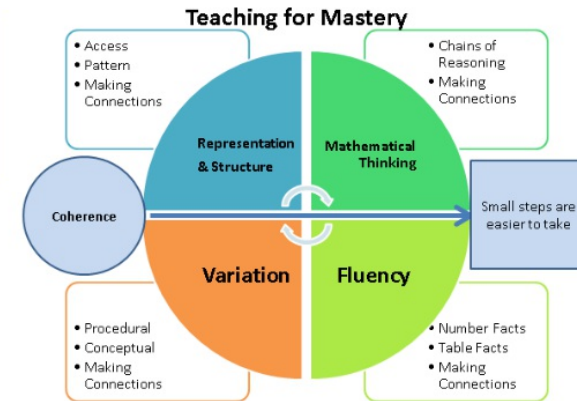


Coherence

Small steps are easier to take

Focussing on one key point in each lesson allows for deep and sustainable learning

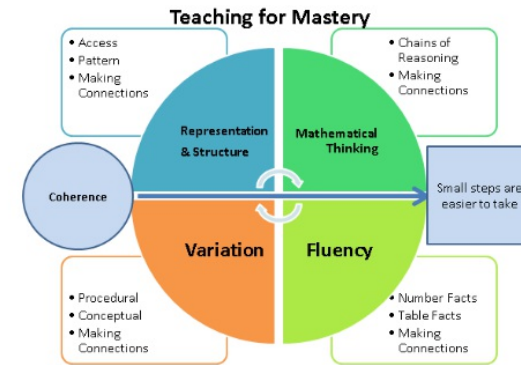
The whole class are taught together



Coherence

Small steps in terms of sequencing –
book look about how we teach
sequentially with small steps.

Variation



When constructing a set of activities or questions it is important to consider what connects the examples; what mathematical structures are being highlighted?

Variation is not the same as variety - careful attention needs to be paid to what aspects are being varied and what is not, and for what purpose.



What is variation?

Conceptual variation

The opportunity to work on different representations of the same mathematical idea.

How many ways?

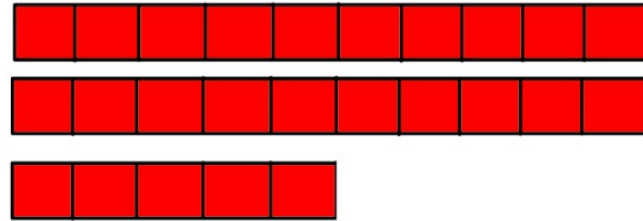
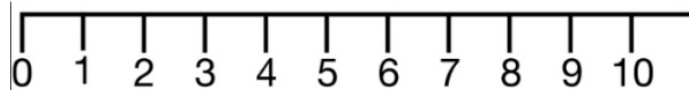


What is the same?

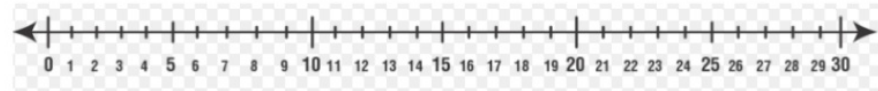
What is different?



$$5 - 2 = \underline{\quad}$$



$$25 - 2 = \underline{\quad}$$



$$4 - 2 = \square$$

$$14 - 2 = \square$$

$$24 - 2 = \square$$

$$34 - 2 = \square$$



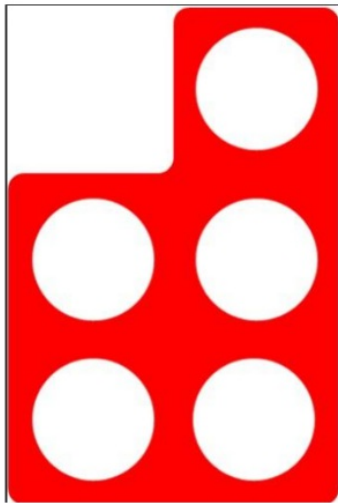


YR



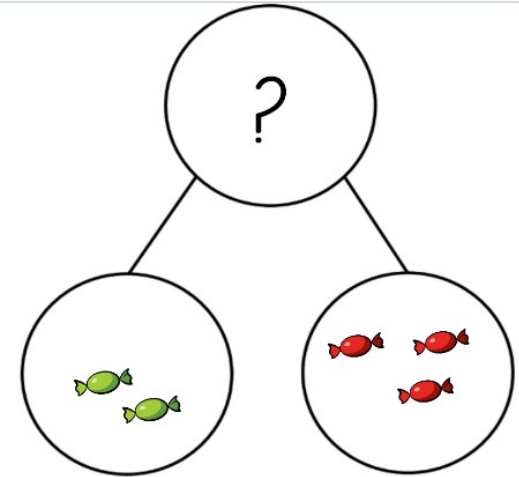
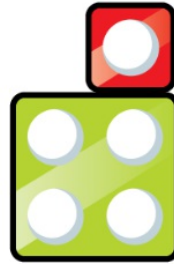
five

5



YI

five

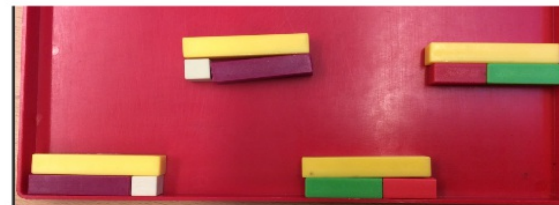


5 + 0	
4 + 1	
3 + 2	
2 + 3	
1 + 4	
0 + 5	

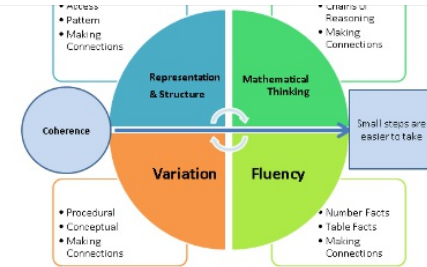
First, there were ____ apples.

Then, I put ____ more in the bag.

Now, there are ____ apples.



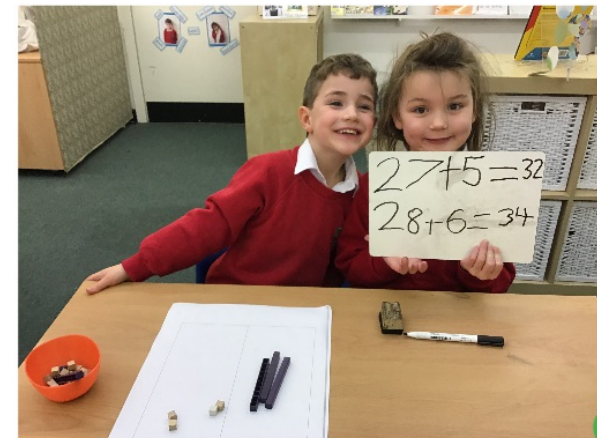
Fluency



Quick and efficient recall of facts and procedures is important in order for learners to keep track of sub problems, think strategically and solve problems.

Fluency demands more of learners than just memorisation of facts. It encompasses a mixture of efficiency, accuracy and flexibility

We want children to recognise relationships, make connections and make appropriate choices from a whole toolkit of methods, strategies and approaches.



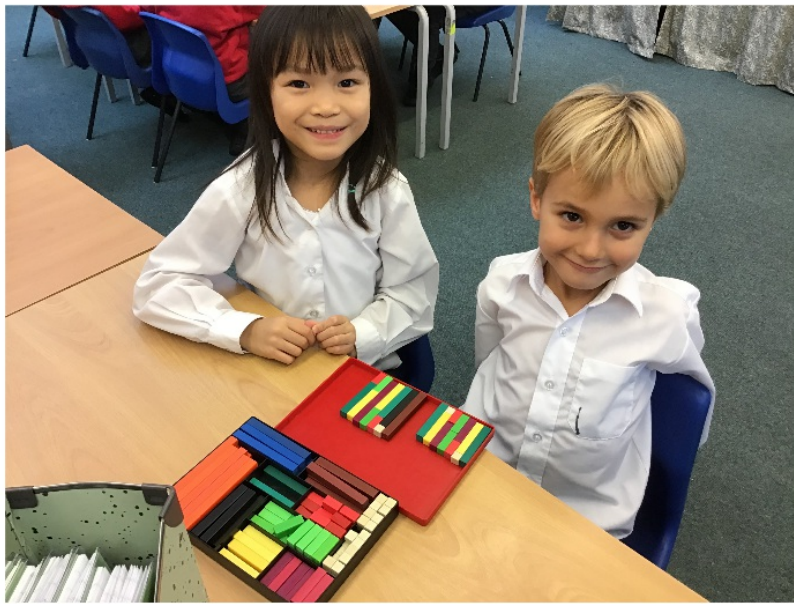
0+0	1+0	2+0	3+0	4+0	5+0	6+0	7+0	8+0	9+0	10+0
0+1	1+1	2+1	3+1	4+1	5+1	6+1	7+1	8+1	9+1	10+1
0+2	1+2	2+2	3+2	4+2	5+2	6+2	7+2	8+2	9+2	10+2
0+3	1+3	2+3	3+3	4+3	5+3	6+3	7+3	8+3	9+3	10+3
0+4	1+4	2+4	3+4	4+4	5+4	6+4	7+4	8+4	9+4	10+4
0+5	1+5	2+5	3+5	4+5	5+5	6+5	7+5	8+5	9+5	10+5
0+6	1+6	2+6	3+6	4+6	5+6	6+6	7+6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



0-0	1-0	2-0	3-0	4-0	5-0	6-0	7-0	8-0	9-0	10-0
1-1	2-1	3-1	4-1	5-1	6-1	7-1	8-1	9-1	10-1	11-1
2-2	3-2	4-2	5-2	6-2	7-2	8-2	9-2	10-2	11-*2	12-2
3-3	4-3	5-3	6-3	7-3	8-3	9-3	10-3	11-3	12-3	13-3
4-4	5-4	6-4	7-4	8-4	9-4	10-4	11-4	12-4	13-4	14-4
5-5	6-5	7-5	8-5	9-5	10-5	11-5	12-5	13-5	14-5	15-5
6-6	7-6	8-6	9-6	10-6	11-6	12-6	13-6	14-6	15-6	16-6
7-7	8-7	9-7	10-7	11-7	12-7	13-7	14-7	15-7	16-7	17-7
8-8	9-8	10-8	11-8	12-8	13-8	14-8	15-8	16-8	17-8	18-8
9-9	10-9	11-9	12-9	13-9	14-9	15-9	16-9	17-9	18-9	19-9
10-10	11-10	12-10	13-10	14-10	15-10	16-10	17-10	18-10	19-10	20-10



If children are not fluent in basic addition and subtraction facts, then when solving complex problems the working memory is taken up by calculating basic facts and children have less working memory to focus on solving the actual problem.



The Chinese understand that mathematicians need to be fluent and efficient.

They do not practise again and again. They practise looking at structures and relationships within the mathematics. They look for the easy ways.

FIND THE SECRETS!



Mathematical thinking

Mathematical thinking is central to deep and sustainable learning of mathematics.

Ideas need to be thought about, reasoned with and discussed.

Mathematical thinking involves looking for patterns to understand structure, looking for relationships/connecting ideas and reasoning logically, explaining and proving.



The YI key objectives



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

Number – number and place value

Statutory requirements

Pupils should be taught to:

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
- given a number, identify one more and one less
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- read and write numbers from 1 to 20 in numerals and words.




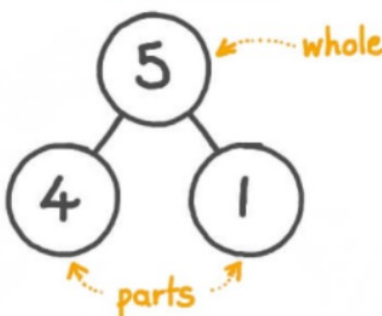
Number – addition and subtraction

Statutory requirements

Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$.

Find the missing numbers in the subtraction sentences matching the given part-whole model.



$5 - 4 = \boxed{1}$ $\boxed{5} - 1 = 4$
 $1 = \boxed{5} - 4$ $4 = 5 - \boxed{1}$

Number – multiplication and division

Statutory requirements

Pupils should be taught to:

- 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.

summer term

Complete the sentences



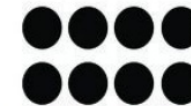
There are ___ groups of ___ pencils.



There are ___ groups of ___ flowers.

Array

an arrangement of a set
of numbers or objects in
rows and columns



Not taught for mastery in Y1 at BPS

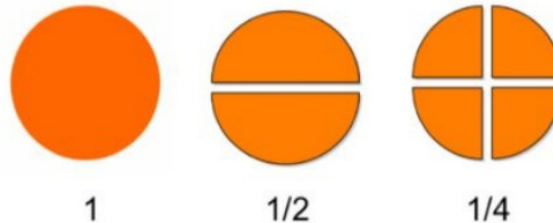
Number – fractions

Statutory requirements

Pupils should be taught to:

- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

Whole, Half, Quarter



1

$\frac{1}{2}$

$\frac{1}{4}$



Measurement

Statutory requirements

Pupils should be taught to:

- compare, describe and solve practical problems for:
 - lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
 - mass/weight [for example, heavy/light, heavier than, lighter than]
 - capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]
 - time [for example, quicker, slower, earlier, later]
- measure and begin to record the following:
 - lengths and heights
 - mass/weight
 - capacity and volume
 - time (hours, minutes, seconds)
- recognise and know the value of different denominations of coins and notes
- sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
- recognise and use language relating to dates, including days of the week, weeks, months and years
- tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.



Geometry – properties of shapes

Statutory requirements

Pupils should be taught to:

- recognise and name common 2-D and 3-D shapes, including:
 - 2-D shapes [for example, rectangles (including squares), circles and triangles]
 - 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].

Notes and guidance (non-statutory)

Pupils handle common 2-D and 3-D shapes, naming these and related everyday objects fluently. They recognise these shapes in different orientations and sizes, and know that rectangles, triangles, cuboids and pyramids are not always similar to each other.

Geometry – position and direction

Statutory requirements

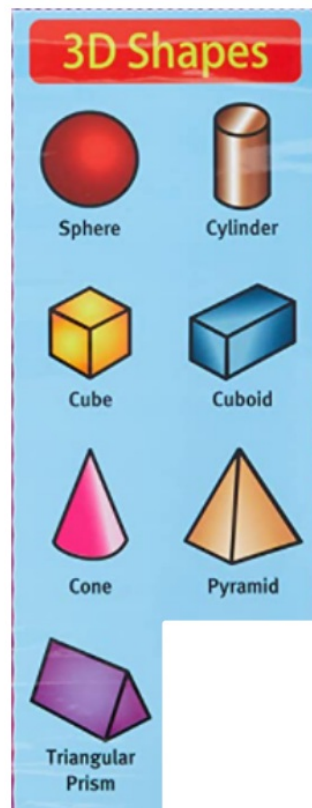
Pupils should be taught to:

- describe position, direction and movement, including whole, half, quarter and three-quarter turns.

Notes and guidance (non-statutory)

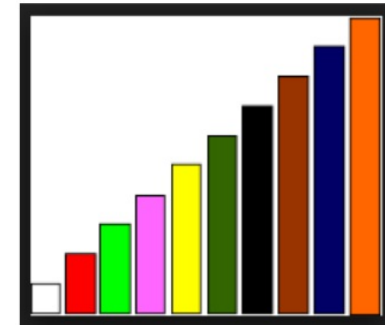
Pupils use the language of position, direction and motion, including: left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside.

Pupils make whole, half, quarter and three-quarter turns in both directions and connect turning clockwise with movement on a clock face.



Number bonds

It is essential that children first work with concrete objects to understand and work out the bonds.



Number bonds

How many ways? (Using resources)

Writing bonds systematically and discussing patterns

Learning the bonds from memory

Using and applying this knowledge



How to help at home



Positive messages about maths

Do not praise children for being 'clever'.

Praise given for hard work.

Let children know that they can improve.

Make maths fun!



Incorporate maths into daily routines



Odd and even patterns

Counting forwards and backwards



Shape hunts
Direction games



Measures in everyday play



"I'm thinking of a number"



Fluency of bonds,
addition and subtraction
facts



Year 1

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

0-0	1-0	2-0	3-0	4-0	5-0	6-0	7-0	8-0	9-0	10-0
1-1	2-1	3-1	4-1	5-1	6-1	7-1	8-1	9-1	10-1	11-1
2-2	3-2	4-2	5-2	6-2	7-2	8-2	9-2	10-2	11-2	12-2
3-3	4-3	5-3	6-3	7-3	8-3	9-3	10-3	11-3	12-3	13-3
4-4	5-4	6-4	7-4	8-4	9-4	10-4	11-4	12-4	13-4	14-4
5-5	6-5	7-5	8-5	9-5	10-5	11-5	12-5	13-5	14-5	15-5
6-6	7-6	8-6	9-6	10-6	11-6	12-6	13-6	14-6	15-6	16-6
7-7	8-7	9-7	10-7	11-7	12-7	13-7	14-7	15-7	16-7	17-7
8-8	9-8	10-8	11-8	12-8	13-8	14-8	15-8	16-8	17-8	18-8
9-9	10-9	11-9	12-9	13-9	14-9	15-9	16-9	17-9	18-9	19-9
10-10	11-10	12-10	13-10	14-10	15-10	16-10	17-10	18-10	19-10	20-10



Regular and often

Raise the profile of maths in line with reading.

Work on number bonds and basic addition and subtraction fluency in particular.

Follow the home learning letter information to continue to add to skills.



Maths Games

Learning numbers up to 20 -

<https://www.topmarks.co.uk/learning-to-count/todays-number-up-to-20>

Good for formation, recognising numerals, one more and one less



Ordering and Sequencing Number

<https://www.topmarks.co.uk/ordering-and-sequencing/caterpillar-ordering>



Number bonds – numbers up to and including 5

<https://ictgames.com/saveTheWhale/oldcdn.html>



Can you balance the scales?

<https://mathszone.co.uk/resources/NumberBalance/>

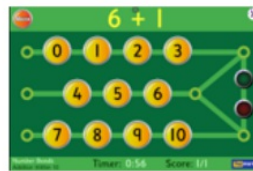
Good for part + part = whole or finding the missing part



Hit the Button –

<https://www.topmarks.co.uk/maths-games/hit-the-button>

Good for number bonds, doubling and halving. If you select number bonds, they children can work on all aims listed on the left-hand side. (Get confident on 'up to 10' section first – up to 20 is taught in the spring term)



Subtraction to 10 -

<https://www.topmarks.co.uk/subtraction/subtraction-to-10>



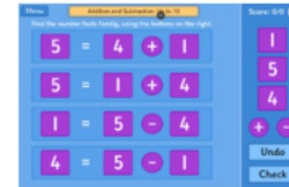
Get to know the number

<https://ictgames.com/mobilePage/getToKnow/index.html>



Number families – <https://www.topmarks.co.uk/number-facts/number-fact-families>

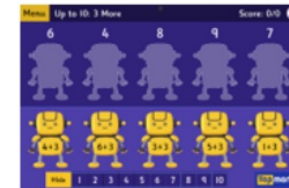
Good for addition and subtraction up to 10 (autumn term) and up to 20 (spring term). Showing links with addition and subtraction



Adding and subtracting -

<https://www.topmarks.co.uk/maths-games/robot-more-or-less>

Choose a number to add or subtract. Then match the questions to the answer.



Noticing and completing patterns -

<https://www.topmarks.co.uk/ordering-and-sequencing/shape-patterns>

Select Level 1 or Level 2



Place value

<https://www.topmarks.co.uk/learning-to-count/place-value-basketball>

Select number up to 19



Money

<https://www.topmarks.co.uk/money/toy-shop-money>

Good for either repeated addition (adding using 5ps for example) or for using coins to make a price. This is taught in the summer term but you can use this to pre-teach or once we have learnt in class. Children have less contact with coins now so this can be helpful.



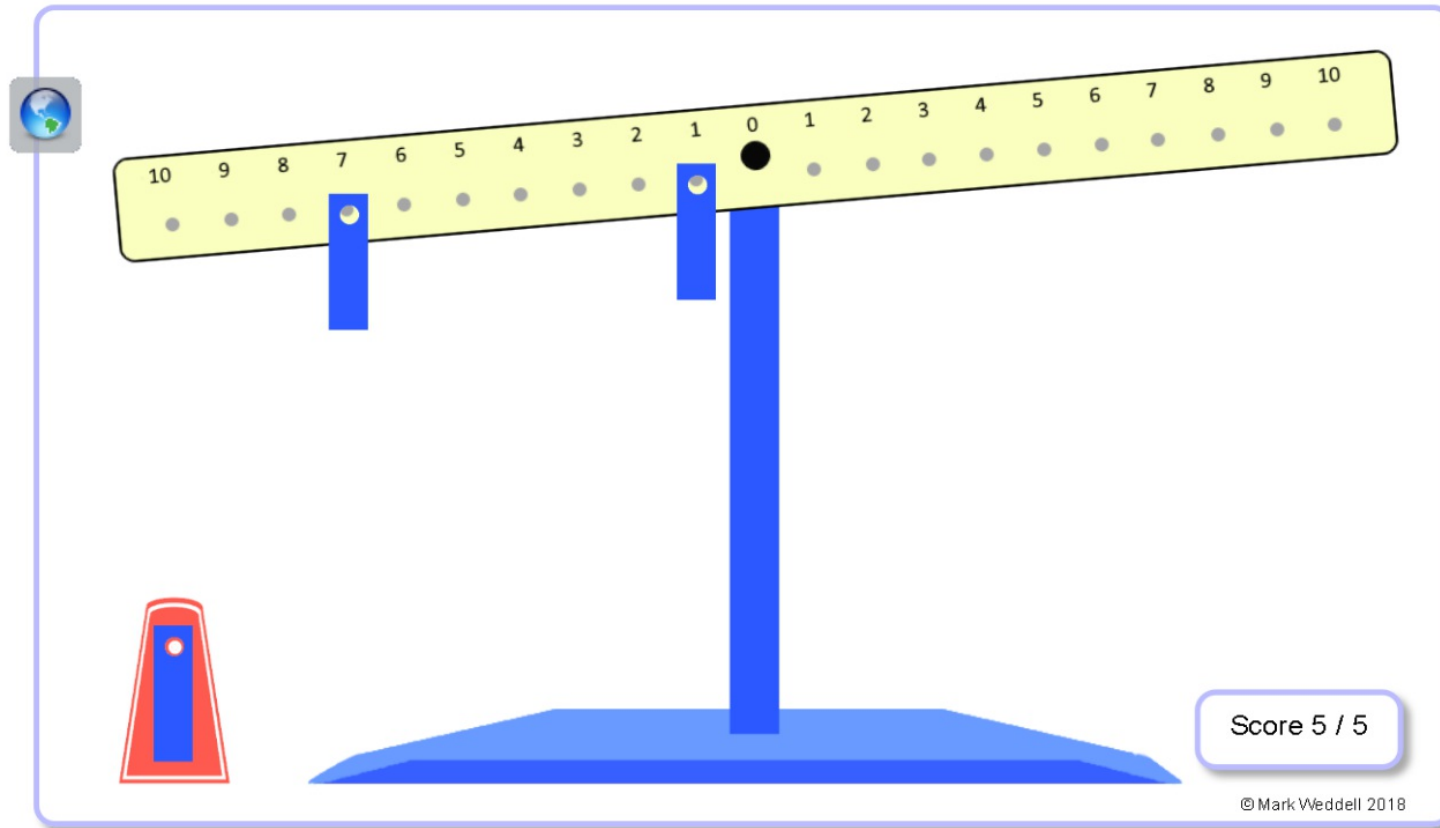
Interactive resources not games to assist with understanding

Tens frames - <https://ictgames.com/mobilePage/tenFrames/index.html>

Place value - <https://ictgames.com/mobilePage/placeValuePieces/index.html>



Can you balance the scales?





Hit the button

Menu **1** X

Number Bonds
Make 10

Timer: 0:58 Score: 0/0 Topmarks

This interface shows a 3x4 grid of yellow circles containing numbers 0-10. A green line connects the circles in each row. On the right, a green line connects the circles in each column. A green line also connects the circles in each row and column, forming a grid. A green line connects the circles in each row and column, forming a grid. A green line connects the circles in each row and column, forming a grid.

Menu **5 + 4** X

Number Bonds
Addition Within 10

Timer: 0:56 Score: 1/1 Topmarks

This interface shows a 3x4 grid of yellow circles containing numbers 0-10. A green line connects the circles in each row. On the right, a green line connects the circles in each column. A green line also connects the circles in each row and column, forming a grid. A green line connects the circles in each row and column, forming a grid. A green line connects the circles in each row and column, forming a grid.

Menu **9 - ? = 1** X

Number Bonds
Missing Numbers

Timer: 0:55 Score: 0/0 Topmarks

This interface shows a 3x4 grid of red circles containing numbers 0-10. A green line connects the circles in each row. On the right, a green line connects the circles in each column. A green line also connects the circles in each row and column, forming a grid. A green line connects the circles in each row and column, forming a grid. A green line connects the circles in each row and column, forming a grid.

Menu **Double 6** X

Doubles
Doubles to 10

Timer: 0:53 Score: 1/1 Topmarks

This interface shows a 3x4 grid of red circles containing numbers 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20. A green line connects the circles in each row. On the right, a green line connects the circles in each column. A green line also connects the circles in each row and column, forming a grid. A green line connects the circles in each row and column, forming a grid. A green line connects the circles in each row and column, forming a grid.

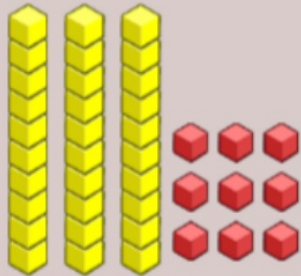




tally:



deines:



one fewer:


38

28

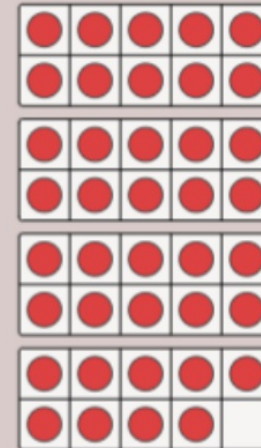
one more:

40

thirty-nine

 odd

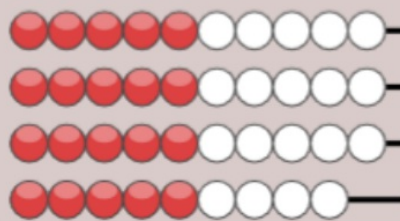
ten frame:



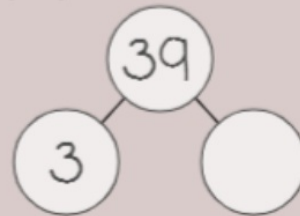
place value counters:



rekenrek:

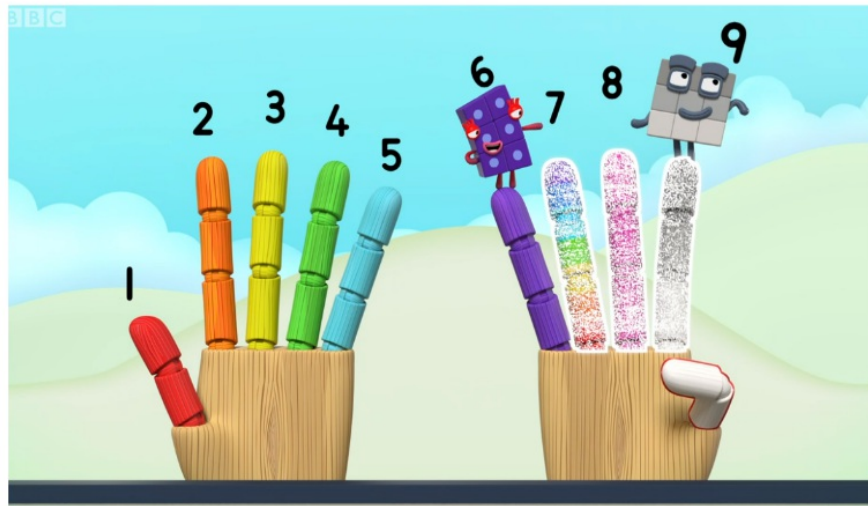


part part whole:



cuisenaire:





Thank you for coming!

