Y1 mathematics workshop

Y1 mathematics workshop

Aims of today

- To learn about how we teach maths and the resources we use

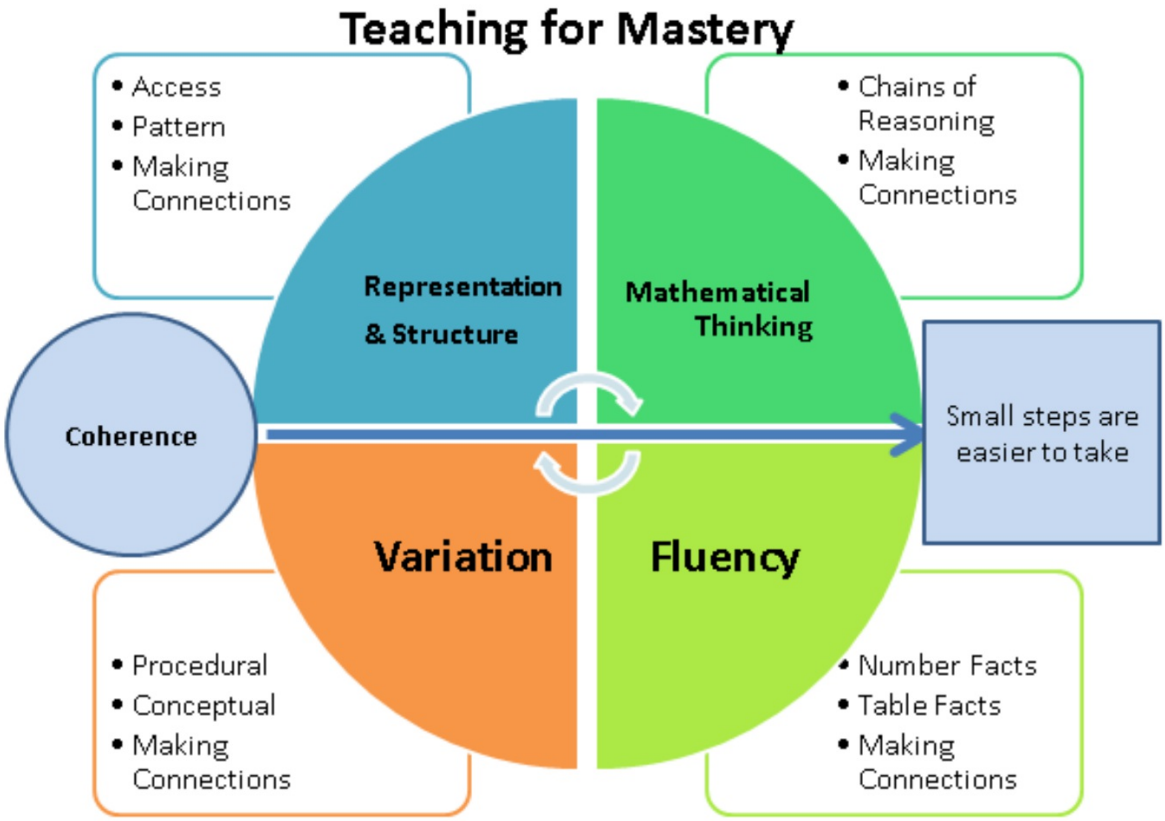
- To understand the key objectives for Y1

- To focus on developing fluency of addition and subtraction facts

- How to help at home, including interactive games

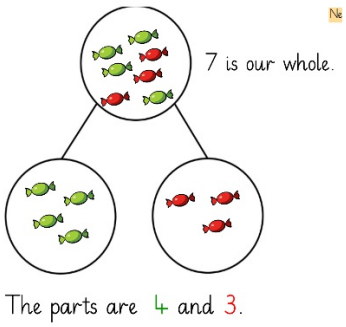
The maths mastery approach

The five big ideas



Representation and structure

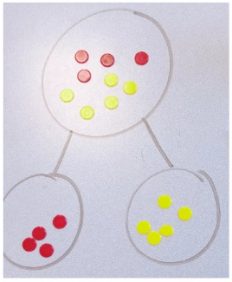
Concrete - Pictorial - Abstract



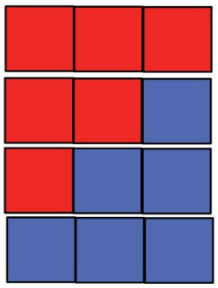
The whole is 7.
The parts are 4 and 3.
7 = 4 + 3

Making number bonds

.



Seeing pictures of number bonds.



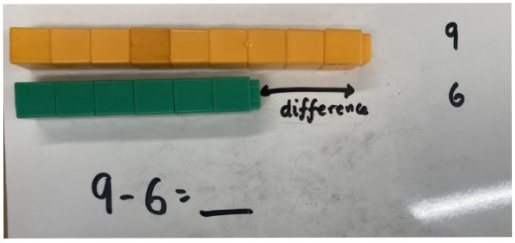
Writing or saying number bonds.

4 + 0 = 4
3 + 1 = 4
2 + 2 = 4
1 + 3 = 4
0 + 4 = 4

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

diennes

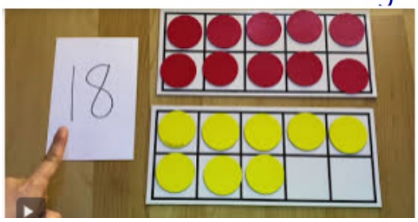
bead string



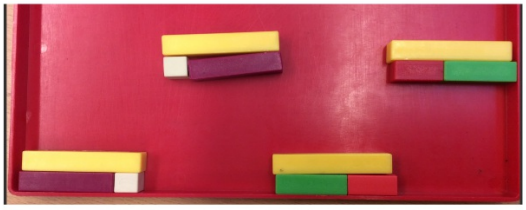
unifix

numicon

counters tens frame

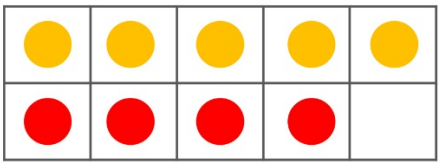


Cuisenaire rods

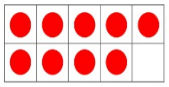


NCETM

Show the same number on your rekenrek using only one push



Let's make 10!

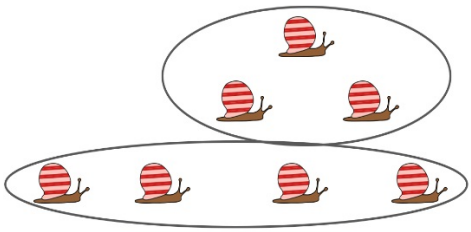


____ needs ____ to make 10.

Look for the parts when 5 is the whole

____ is the whole;
____ is a part and ____ is a part.

How many ways can you see the parts in 7?

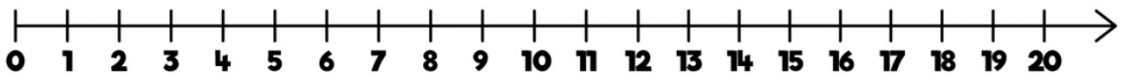


____ is the whole;
____ is a part and ____ is a part.

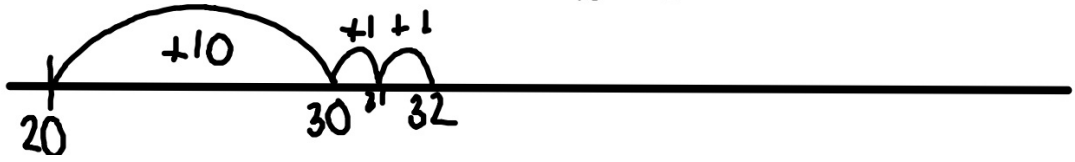
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

number square

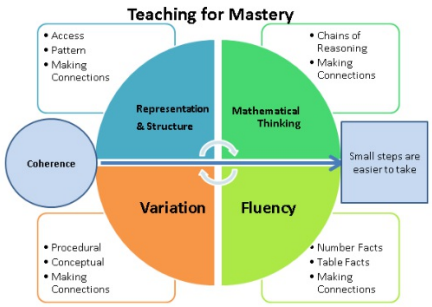
number line



blank number line $20 + 12 =$



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

What is variation?

Conceptual variation

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

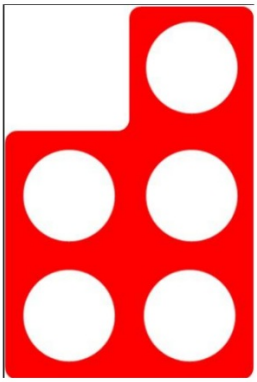
How many ways?

YN

YR

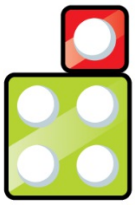
five

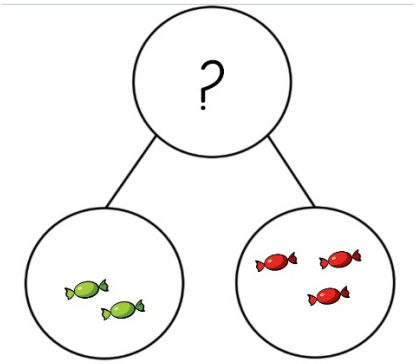
5

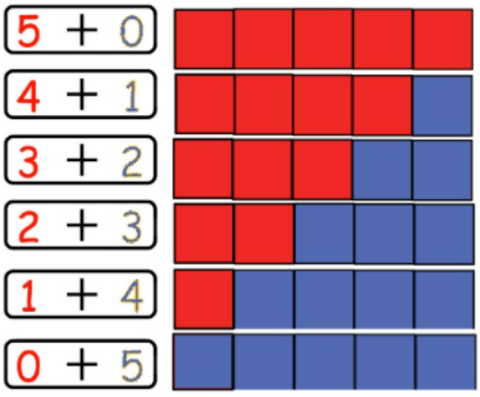


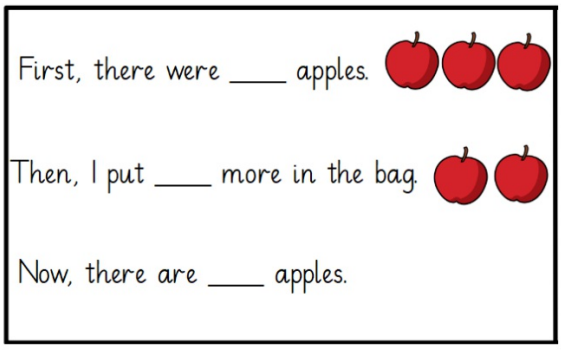
Yl

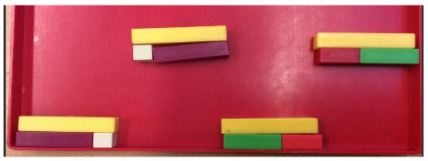
five




?

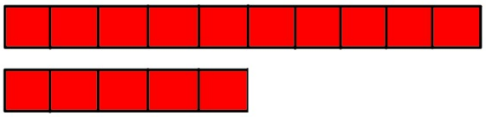

5 + 0
4 + 1
3 + 2
2 + 3
1 + 4
0 + 5


First, there were ____ apples.
Then, I put ____ more in the bag.
Now, there are ____ apples.

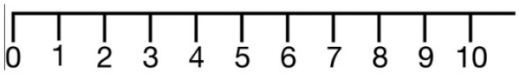


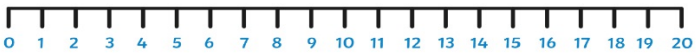
What is the same?
What is different?

5 - 2 = ___



15 - 2 = ___





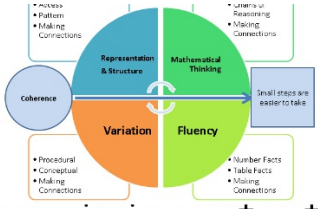
$4 - 2 = \square$

$14 - 2 = \square$

$24 - 2 = \square$

$34 - 2 = \square$

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 memoristation 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
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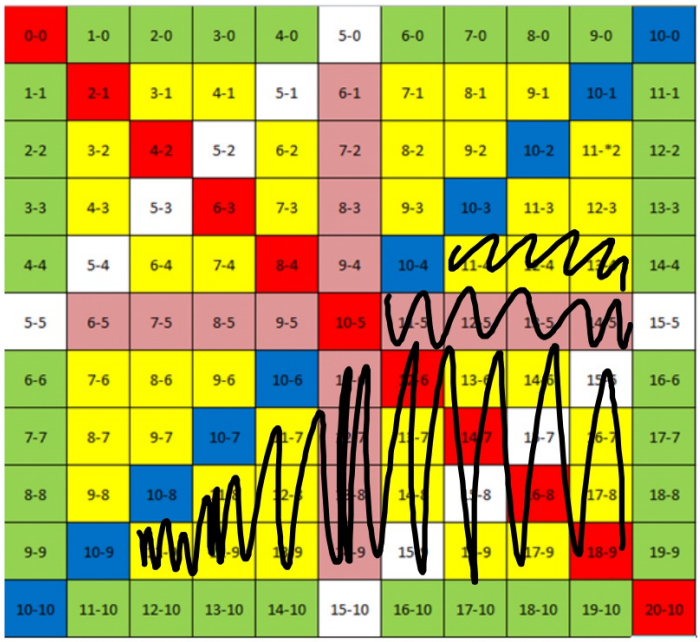
8-8	9-8	10-8	11-8	12-8	13-8	14-8	15-8	16-8	17-8	18-8
9-9	10-9	11-9	12-9	13-9	14-9	15-9	16-9	17-9	18-9	19-9
10-10	11-10	12-10	13-10	14-10	15-10	16-10	17-10	18-10	19-10	20-10

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

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.

Mathematical thinking

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

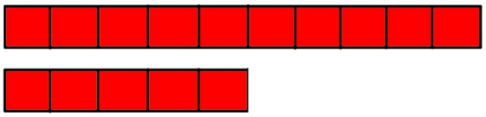
Ideas needs to be thought about, reasoned with and discussed.

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

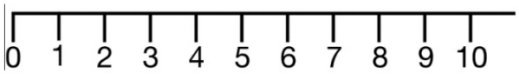
10 - 1 =

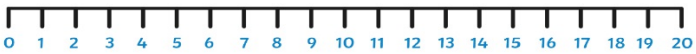
What is the same?
What is different?

5 - 2 = ___



15 - 2 = ___





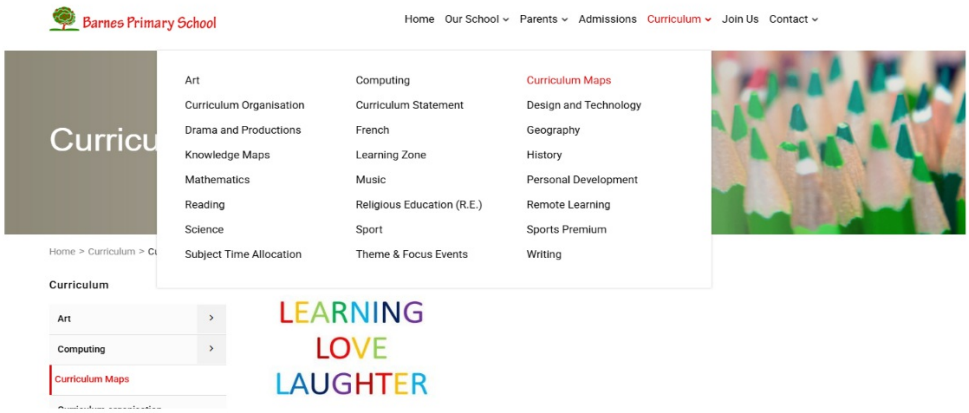
$4 - 2 = \square$

$14 - 2 = \square$

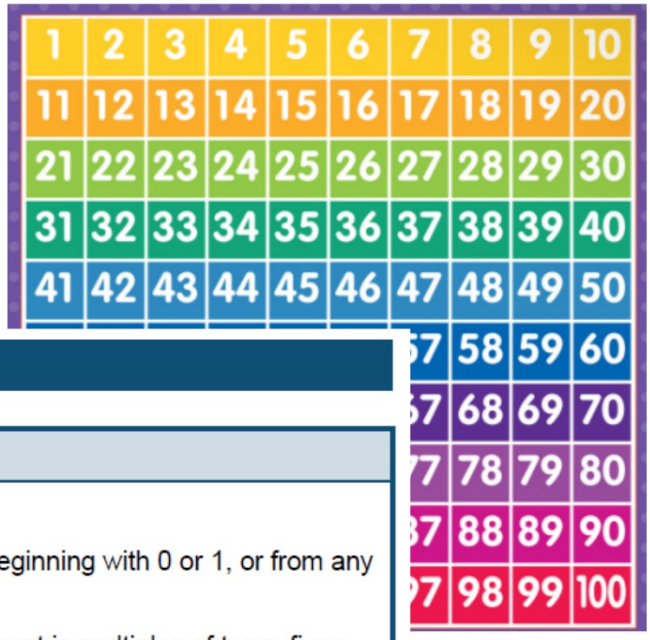
$24 - 2 = \square$

$34 - 2 = \square$

The Y1 key objectives



Autumn: Addition and subtraction up to 10
Spring: Property of shapes, place value, addition and subtraction up to 20
Summer: Measurment, place value to 100 and multiplication and division



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.

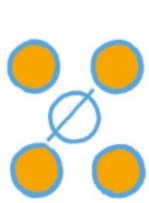
Number – addition and subtraction

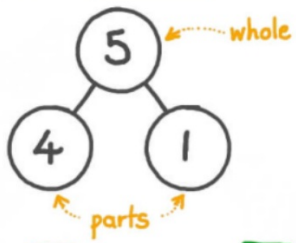
Statutory requirements

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 = ☐ – 9.

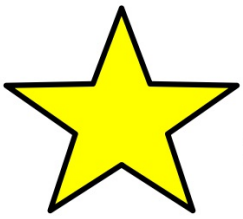
Find the missing numbers in the subtraction sentences matching the given part-whole model.





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

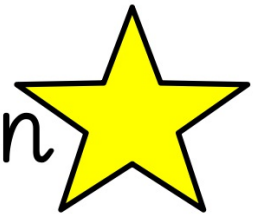
$1 = \boxed{5} - 4$ $\quad\quad$ $4 = 5 - \boxed{1}$

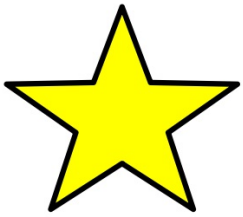


add

+

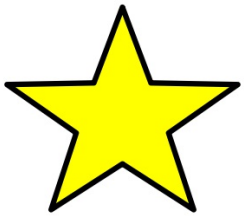
more than

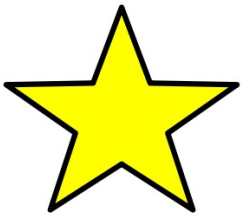




plus

altogether





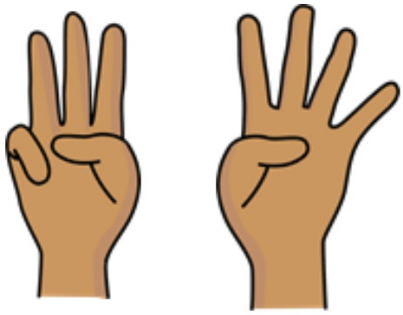
total

How do you add?

after teaching
with manipulatives

3 + 4 =

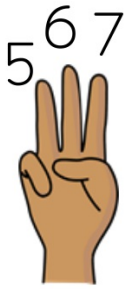
I use my fingers.
I make 3 and 4.
Then, I count them
altogether.



How do you add?

$3 + 4 =$

I put 4 in my head because it's bigger.
Then count on 3 more.



How do you add?

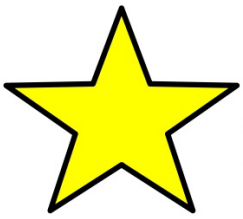
$3 + 4 =$

I know that 7 is made of 3 and 4, so 3 + 4 = 7.

How do you add?

$3 + 4 =$

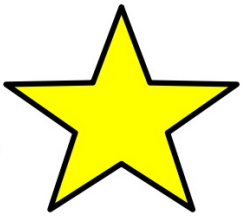
I know that 4 + 4 = 8
so 3 + 4 must be one less.
It's 7!

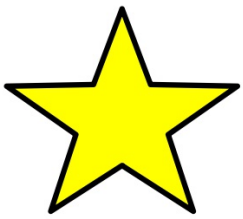


subtract

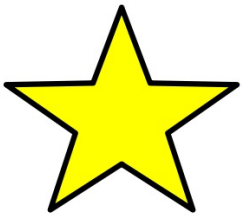
−

less than



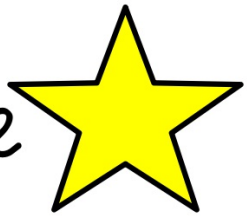


take away



minus

difference



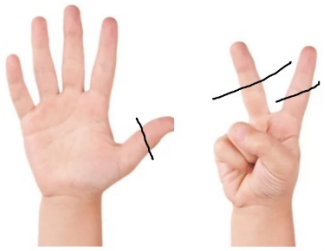
●

After concrete work with items.

Fingers

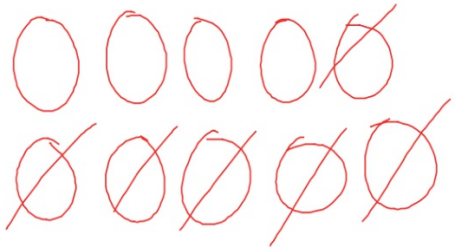
7 - 3 =

Make the whole with your fingers.
Take the part you know away.
The answer is what you're left with.

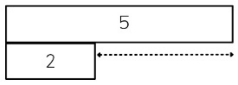


Draw it

10 - 6 = 4



Counting back



5 - 2 =

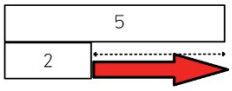
4 3

Count back the part you know.

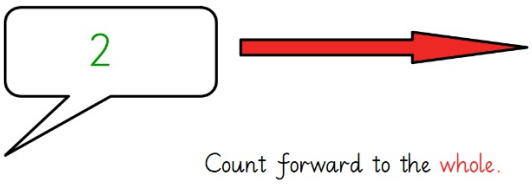
The missing part is the last number you say!

Put the whole in your head.

Counting up



5 - 2 =



Count forward to the whole.

The missing part is how many fingers you have up!

Put the part in your head.

or knowing number facts

How do you subtract?

5 - 2 =

I know that 5 is made of 2 and 3, so 5 subtract 3 is 2.

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

Year 1 — Multiplication and Division

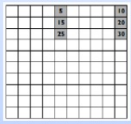
- Solve one- step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
- Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.
- They make connections between arrays, number patterns and counting in twos, fives and tens.

Counting in steps of different sizes

Teachers and/or pupils may demonstrate these strategies on a numbered number line supported by a variety of materials.

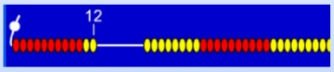
Counting

Laying foundations for multiplying and dividing by maximising opportunities when counting. Progress from counting in ones, to skip counting / repeated addition.



Use 100 grid to discuss patterns counting in 2s, 5s and 10s

Counting in twos



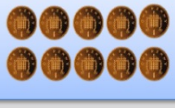
Counting on and back ITP

Cuisenaire on number track

Counting on fingers

UNITISING

=



Unitising—Children need to understand that one object can represent more than one item. E.g. a 2p coin or a piece

COUNTING

Using Numicon or Cuisenaire for doubles.

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

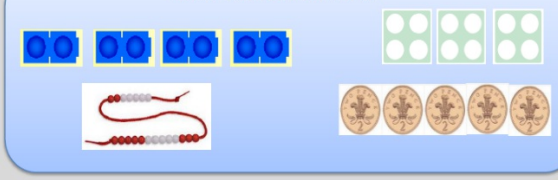
1 1/2 1/4

Year 1 — Multiplication and Division

MODELS

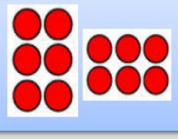
Calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Lots of and groups of the same thing.



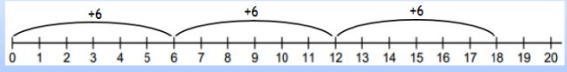
Arrays

Arrays can be used to support children in their understanding the structure of multiplication and division.



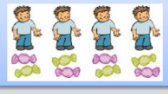
One step problems involving multiplication and division

Jill has 3 bags of oranges and each has six oranges in it. How many oranges does she have?



Sharing

There are eight sweets and four boys. How many sweets does each boy get?



Grouping

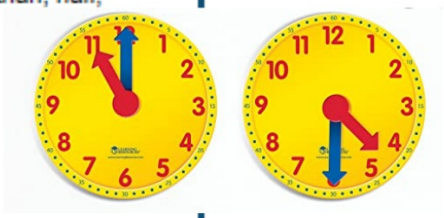
24 eggs are packed into boxes of 6. Put 6 eggs in the first box and continue until there are none left. How many boxes are needed?

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

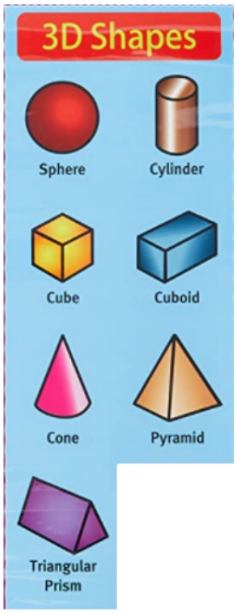
Statutory requirements

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.

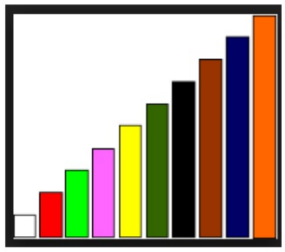
Notes and guidance (non-statutory)

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.



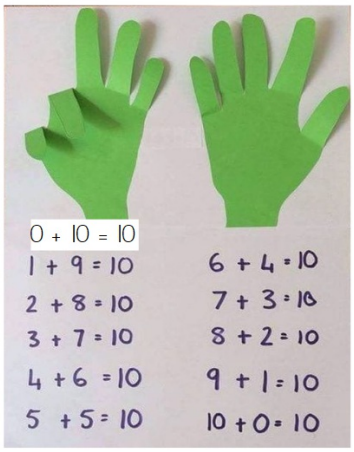
Number bonds

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

Essential principles

With thanks to Professor Jo Boaler, Professor of Mathematics Education at the Stanford Graduate School of Education for her guiding words of wisdom.

Encourage children to play maths puzzles and games. Puzzles and games will help children enjoy maths, and develop number sense, which is critically important.

Always be encouraging and avoid telling children they are wrong when they are working on maths problems. Instead find the logic in their thinking; there is always some logic to what they say.

Never associate maths with speed. It is not important to work quickly, and we now know that forcing children to work quickly on maths can cause maths anxiety for children. Instead of speed drills use visual, fun activities.

Be positive about maths even if your feelings about your own maths education is not!

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

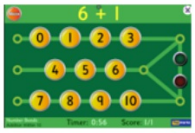
Number bonds – numbers up to and including 5
https://ictgames.com/saveTheWhale/oldcdn.html

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)

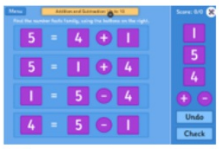


Subtraction to 10 -
https://www.topmarks.co.uk/subtraction/subtraction-to-10

Get to know the number
https://ictgames.com/mobilePage/getToKnow/index.html

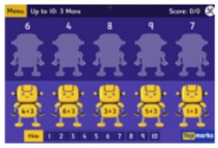
Number families –https://www.topmarks.co.uk/number-facts/number-fact-families

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 -

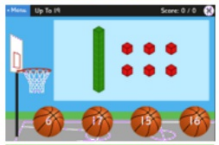
https://www.topmarks.co.uk/ordering-and-sequencing/shape-patterns

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/tenFrame/index.html\

Diennes - https://ictgames.com/mobilePage/placeValuePieces/index.html

home learning

Our School

- A warm welcome
- Academic results
- Admissions (Nursery, Reception year)
- Aims and values
- Eco-school
- Financial information
- Gold Club
- Governing body
- House system
- Our School Pledges
- Phases (EYFS, Key Stage 1, Key Stage 2)
- Pupil voice
- School dog
- Special Educational Needs and

How to help at home

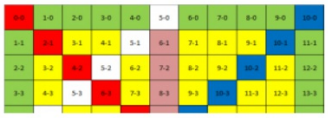
Spelling at home

Maths at home

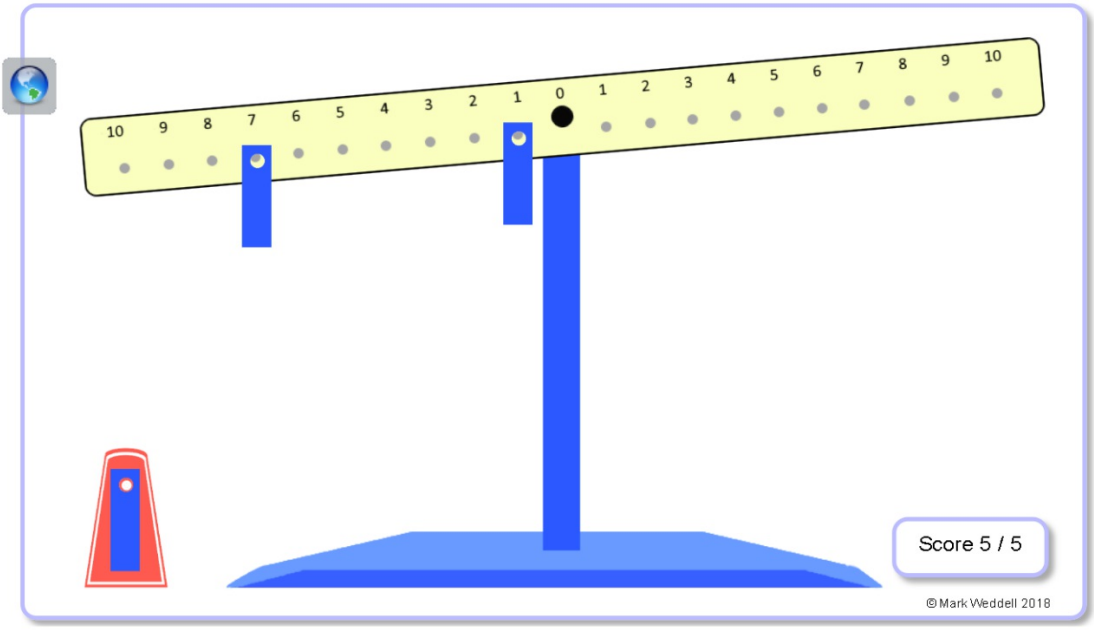
Maths Fluency Card Information

Addition and Subtraction Fluency chart

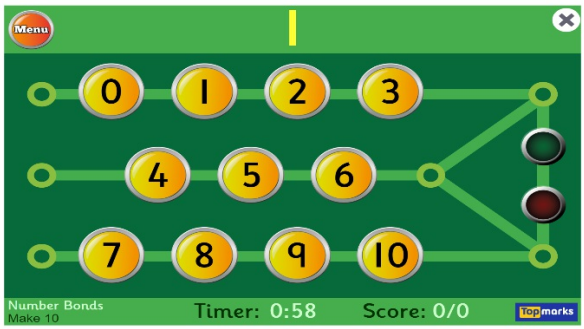
Year 1 Interactive Maths Games

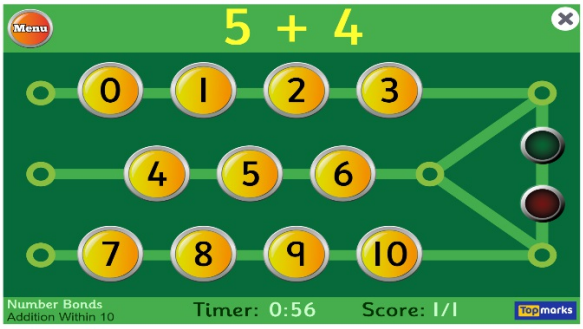


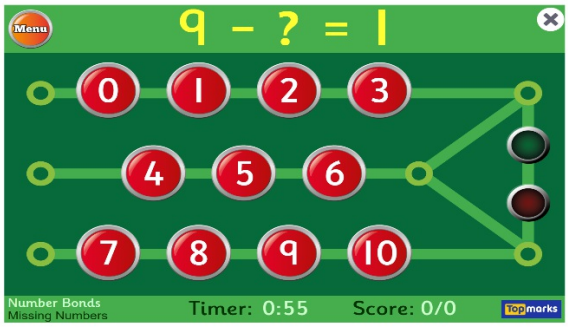
Can you balance the scales?

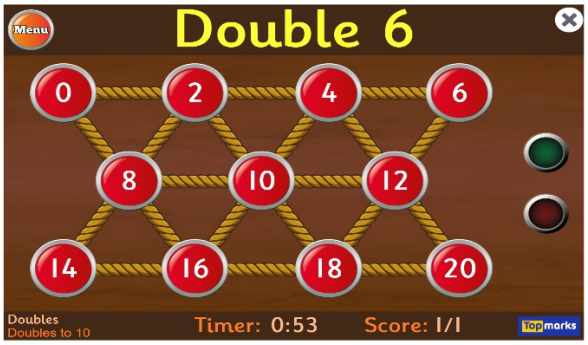


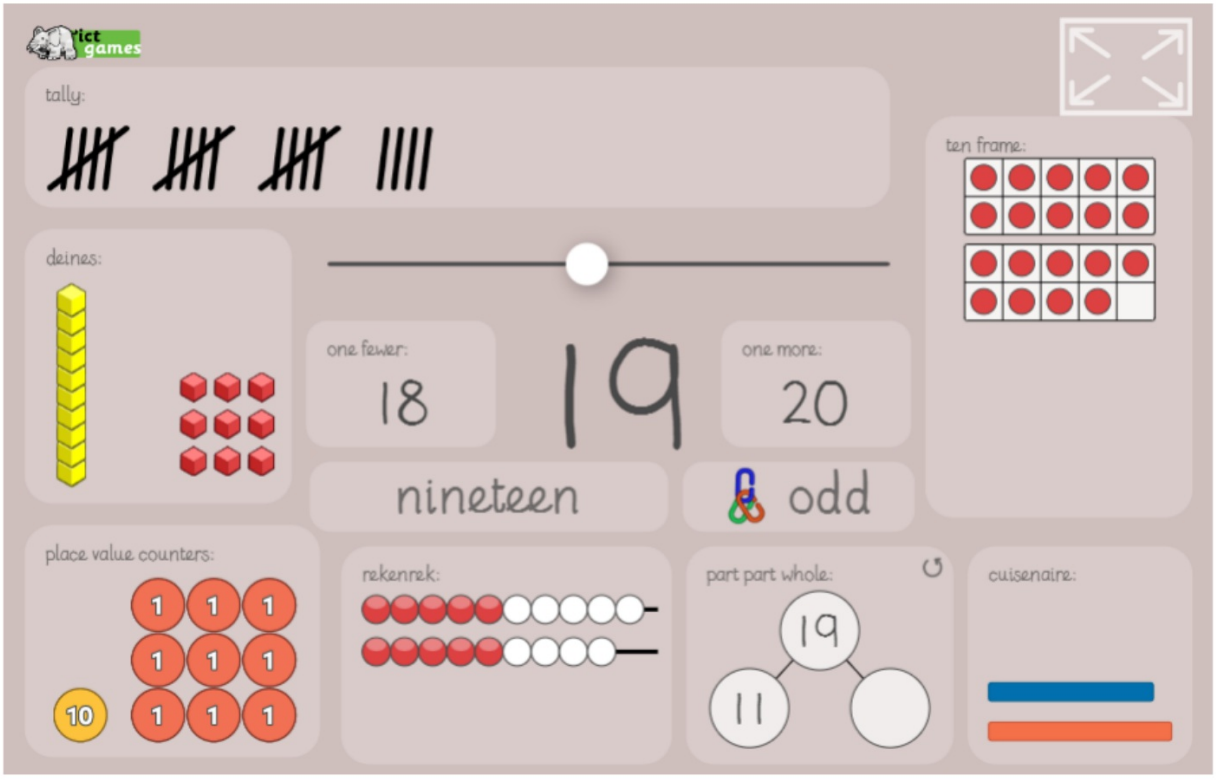
Hit the button



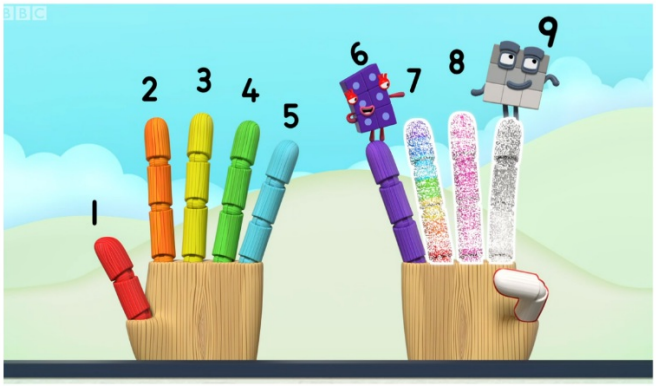







tally:
ten frame:
deines:
one fewer:
18
19
one more:
20
nineteen
odd
place value counters:
10
rekenrek:
part part whole:
19
11
cuisenaire:


Number
BLOCKS




7 − 3 = 4

Thank you for coming!