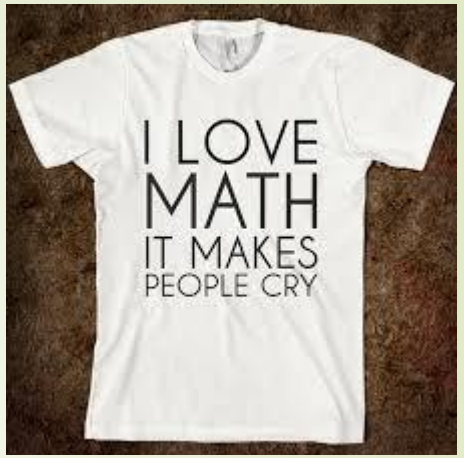
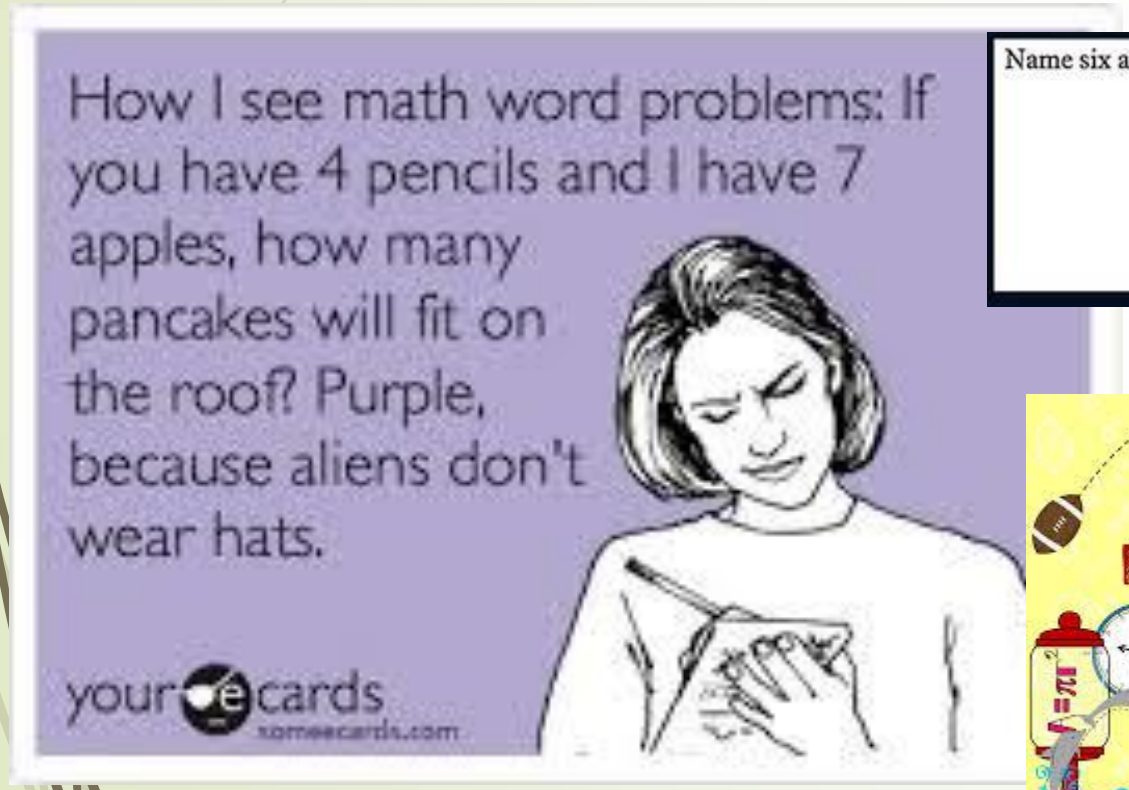
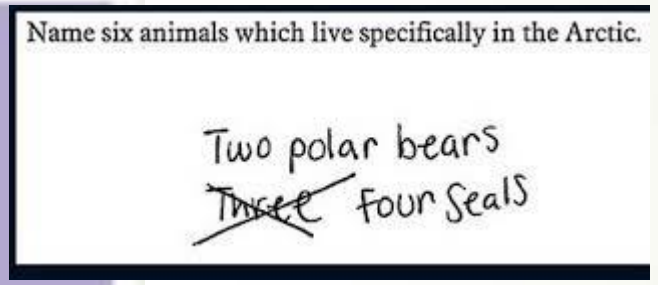
Supporting children's Mathematics

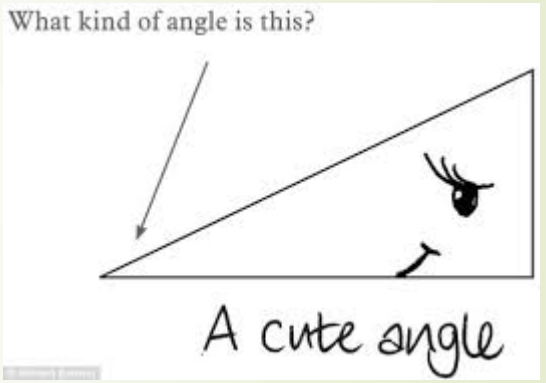
Filleigh Primary School

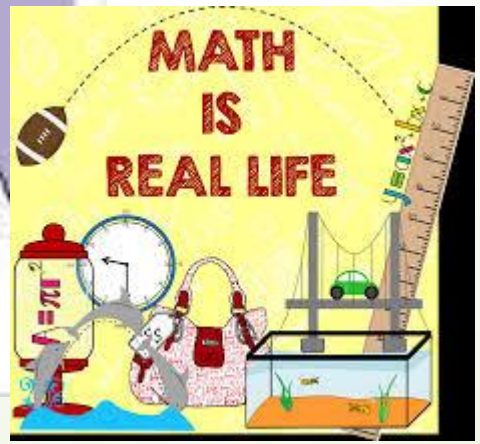
How do you feel about maths?

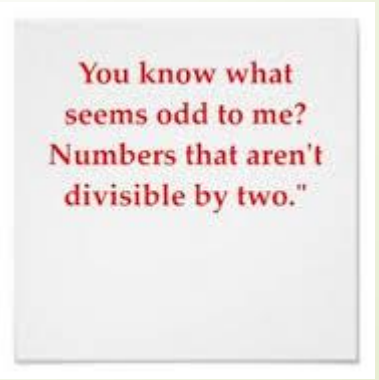












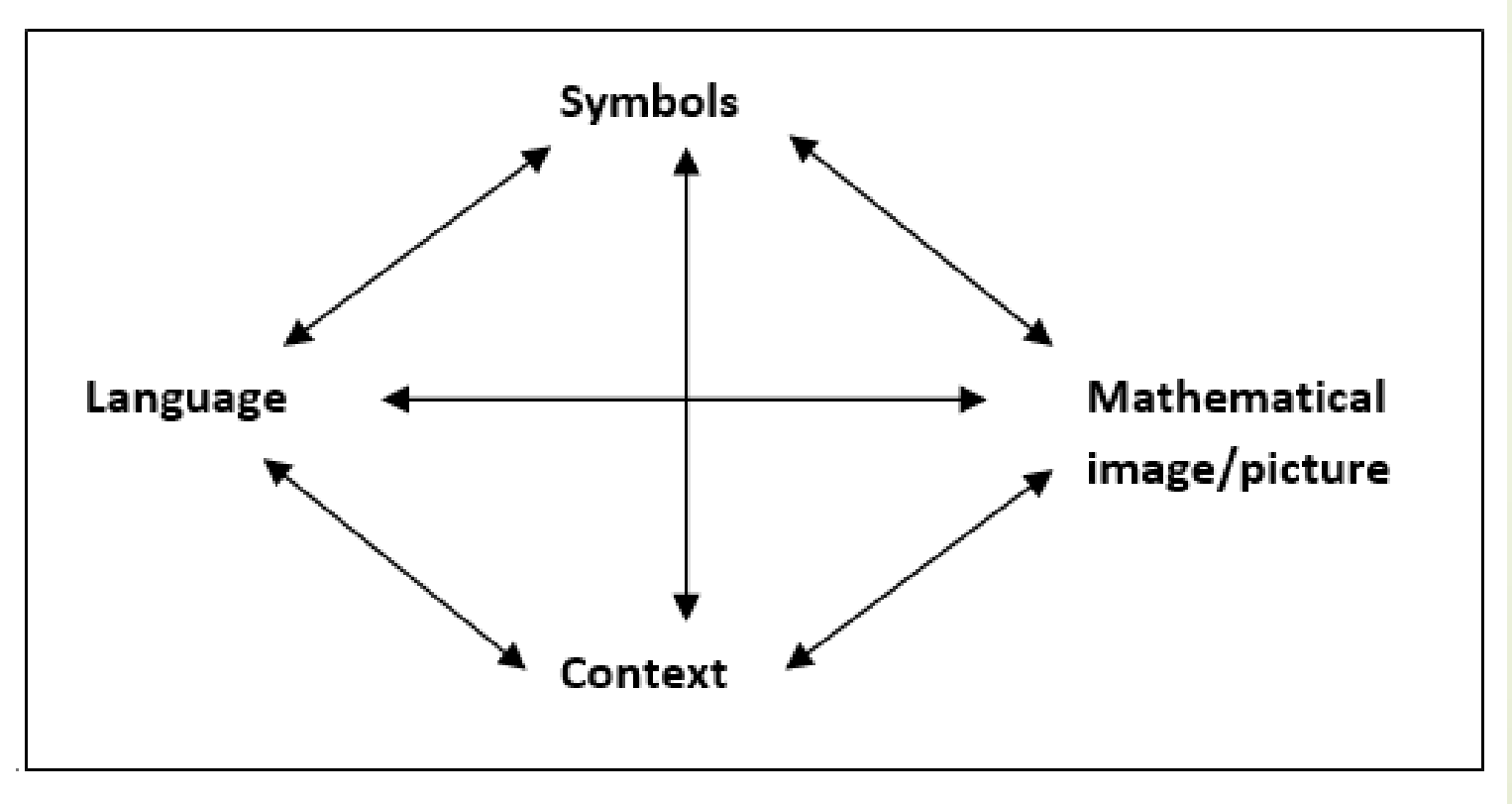
Just to warm up: How many mathematical statements can you make about you age?

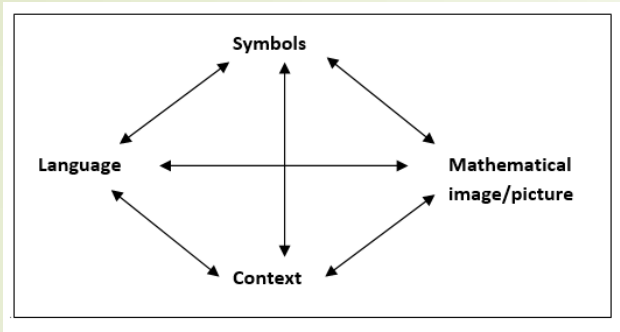
For example: Mr Wright is 3 x 10 +2

What the curriculum says:

- The national curriculum for mathematics aims to ensure that all pupils:
- •become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- •reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- •can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

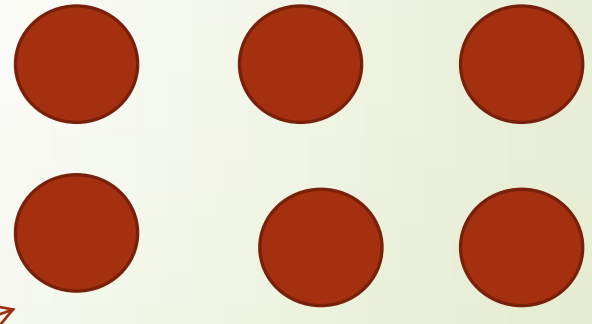
Interconnected mathematics





X

Multiplication
Array
Grouping
Lots of



I have two groups of three cars

When maths goes wrong:

- An extreme example: The Spanish navy have had to scrap a brand new 2Bn Euro submarine after an engineer put the decimal point in the wrong place and the submarine was 70 tonnes over weight and would never float. Please google it, the cost and statistics around it are fascinating.

Key challenges in mathematics:

- Place value
- Number bonds (to 10 and within 10)
- Number facts (times table)

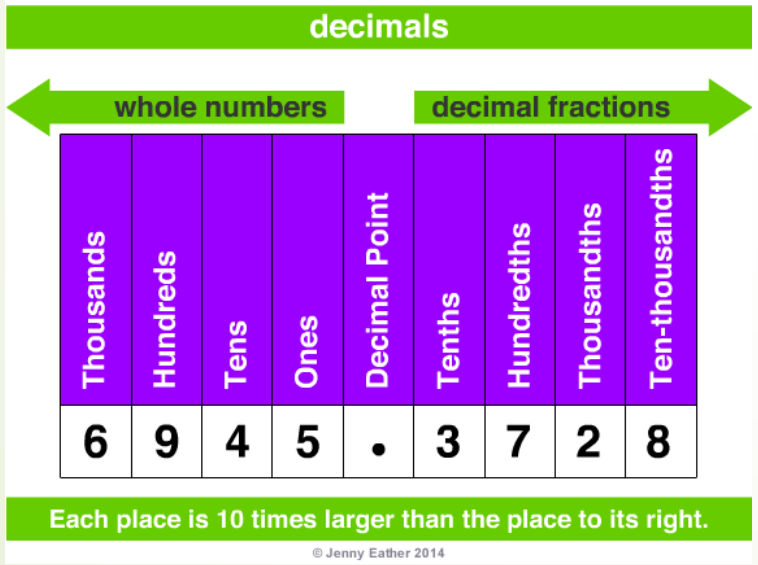
Place value

Base-10 system

- our everyday number system is a Base-10 system.
- the Base-10 number system is known as the decimal system

and has 10 digits to show all numbers
0,1,2,3,4,5,6,7,8,9
using place value and a decimal point to separate whole numbers from decimal fractions.

EXAMPLE:



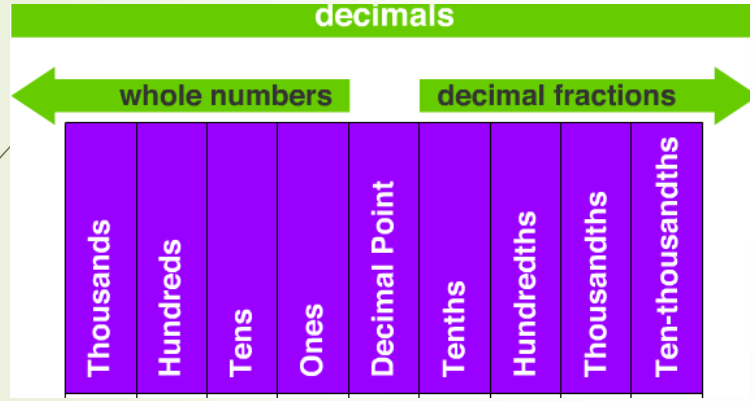
Why do we separate every third number with a comma?

1,327,849

0 isn't nothing!

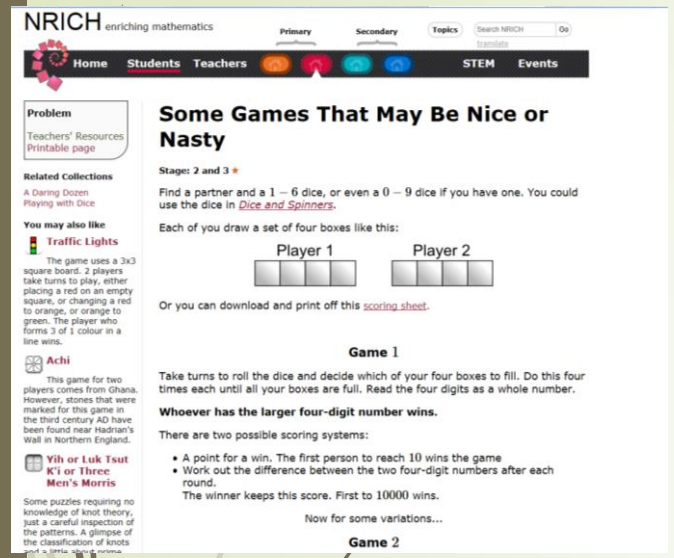
The importance of 10.

The numbers 1 and 0 combine to form 10.



This is 10 lots of 1's grouped into a ten and no 1's remaining in the ones column.

Supporting Place Value at home



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Related Collections

A Daring Dozen

Playing with Dice

You may also like

Traffic Lights

The game uses a 3x3 square board. 2 players take turns to play, either placing a red on an empty square, or changing a red to orange, or orange to green. The player who forms 3 of 1 colour in a line wins.

Achi

This game for two players comes from Ghana. However, stones that were marked for this game in the third century AD have been found near Hadrian's Wall in Northern England.

Yih or Luk Tsut K'i or Three Men's Morris

Some puzzles requiring no knowledge of knot theory, just a careful inspection of the patterns. A glimpse of the classification of knots

Some Games That May Be Nice or Nasty

Stage: 2 and 3 ★

Find a partner and a $1-6$ dice, or even a $0-9$ dice if you have one. You could use the dice in *Dice and Spinners*.

Each of you draw a set of four boxes like this:

Player 1 Player 2

Or you can download and print off this scoring sheet.

Game 1

Take turns to roll the dice and decide which of your four boxes to fill. Do this four times each until all your boxes are full. Read the four digits as a whole number.

Whoever has the larger four-digit number wins.

There are two possible scoring systems:

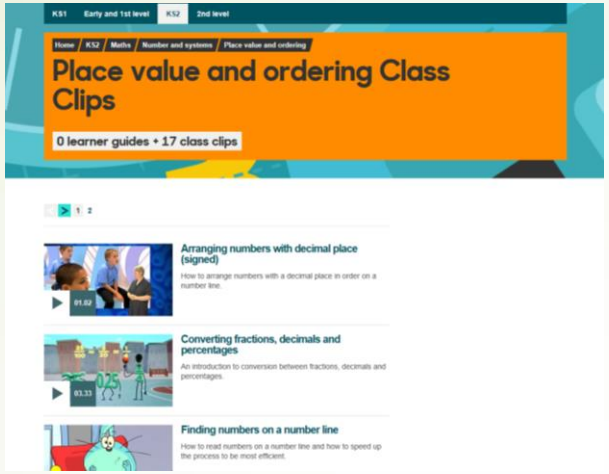
- A point for a win. The first person to reach 10 wins the game
- Work out the difference between the two four-digit numbers after each round.

The winner keeps this score. First to 10000 wins.

Now for some variations...

Game 2

http://nrich.maths.org/6605/note



KS1 Early and 1st level KS2 2nd level

Home / KS2 / Maths / Number and systems / Place value and ordering

Place value and ordering Class Clips

0 learner guides • 17 class clips

Arranging numbers with decimal place (signed)

How to arrange numbers with a decimal place in order on a number line.

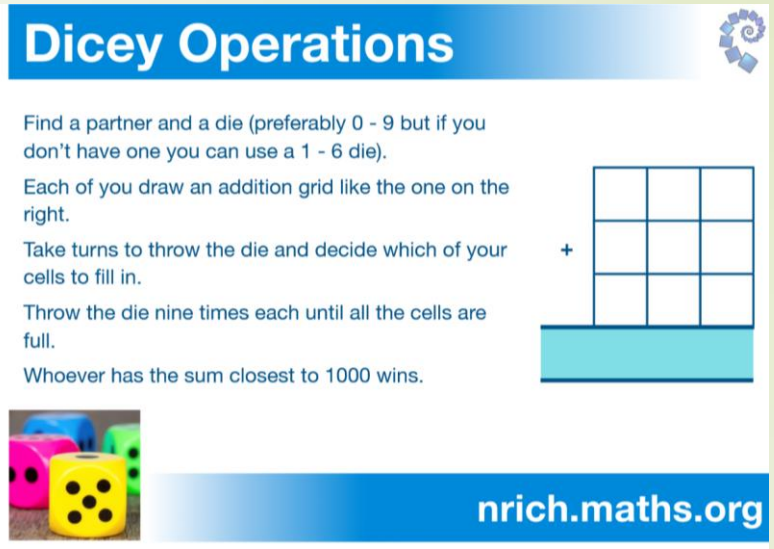
Converting fractions, decimals and percentages

An introduction to conversion between fractions, decimals and percentages.

Finding numbers on a number line

How to read numbers on a number line and how to speed up the process to be most efficient.

http://www.bbc.co.uk/education/topics/zsjqtfr/resources/1



Dicey Operations

Find a partner and a die (preferably 0 - 9 but if you don't have one you can use a 1 - 6 die).

Each of you draw an addition grid like the one on the right.

Take turns to throw the die and decide which of your cells to fill in.

Throw the die nine times each until all the cells are full.

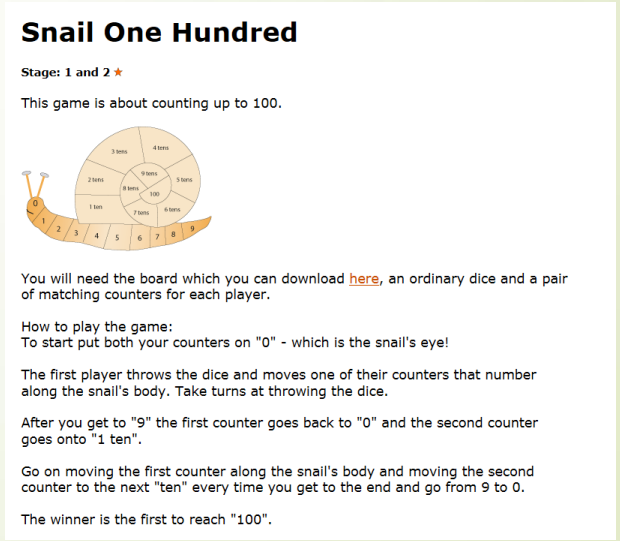
Whoever has the sum closest to 1000 wins.

+

nrich.maths.org

http://nrich.maths.org/content/id/7209/NRICH-poster_DiceyOperations.pdf

Quick add dice. Roll dice (as many as is challenging) race to add as quickly as you can. Look at number bonds for efficient addition



Snail One Hundred

Stage: 1 and 2 ★

This game is about counting up to 100.

You will need the board which you can download here, an ordinary dice and a pair of matching counters for each player.

How to play the game:
To start put both your counters on "0" - which is the snail's eye!

The first player throws the dice and moves one of their counters that number along the snail's body. Take turns at throwing the dice.

After you get to "9" the first counter goes back to "0" and the second counter goes onto "1 ten".

Go on moving the first counter along the snail's body and moving the second counter to the next "ten" every time you get to the end and go from 9 to 0.

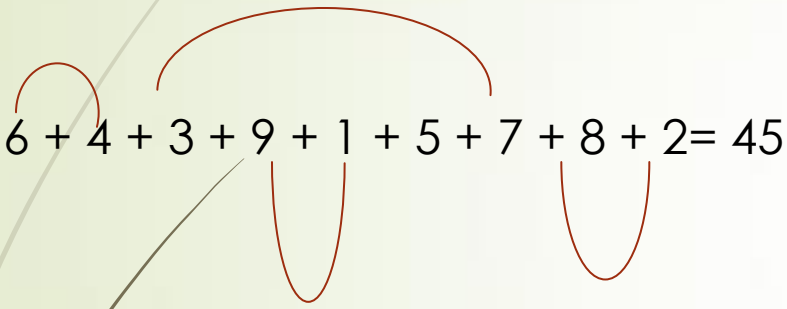
The winner is the first to reach "100".

http://nrich.maths.org/8303

Number bonds:

How would you calculate:

6 + 4 + 3 + 9 + 1 + 5 + 7 + 8 + 2=



This relies on secure number bonds to 10.

We want children to be fluent with the language of number and not rely on counting in ones from the starting number all the way to the equals sign.

Being able to make 10 is massively important:

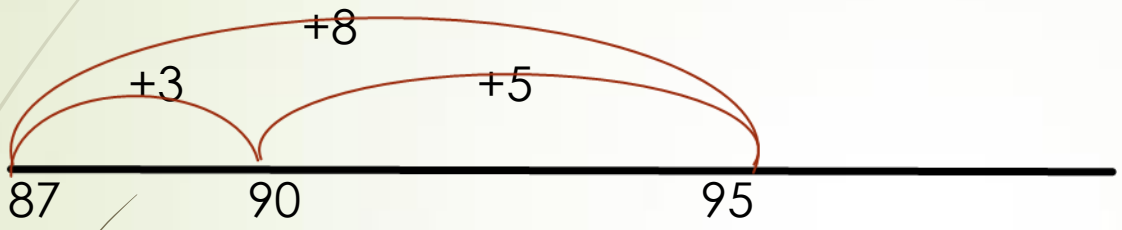
If we understand that 7 + 3 = 10 also begin to understand that:

70+ 30= 100
700+ 300= 1000
7,000+ 3,000= 10,000

0.7 + 0.3 = 1
0.07 + 0.03 = 0.1

When going further and faced with more challenge calculations such as bridging through 10 or 100 knowledge of numberbonds to 10 is vital.

87 + 8 = (87 + 3 + 5) = 95



Some children are reliant on counting in 1's or need to use apparatus or a formal method to calculate this, this is not efficient.

95 – 8 = 87. Children need to understand how one undoes the other. Can be employed as a check to a calculation.

There are two forms of subtraction: Minus and difference.

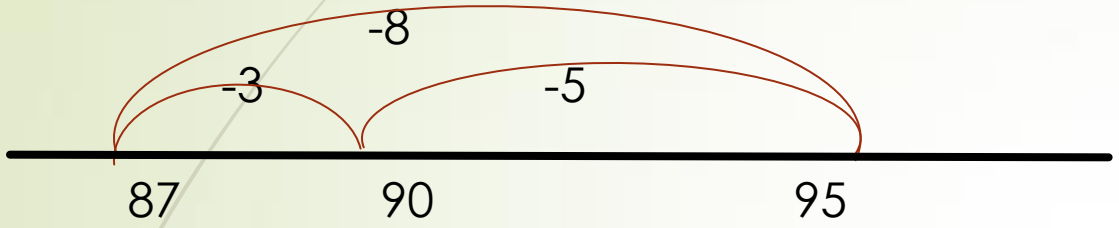
I have £95 pounds and I spend £87 on a food shop, that leaves me with £8.

My friend spent £95 on a pair of football boots and I spent £87 on the same model, the difference in what we paid is £8.

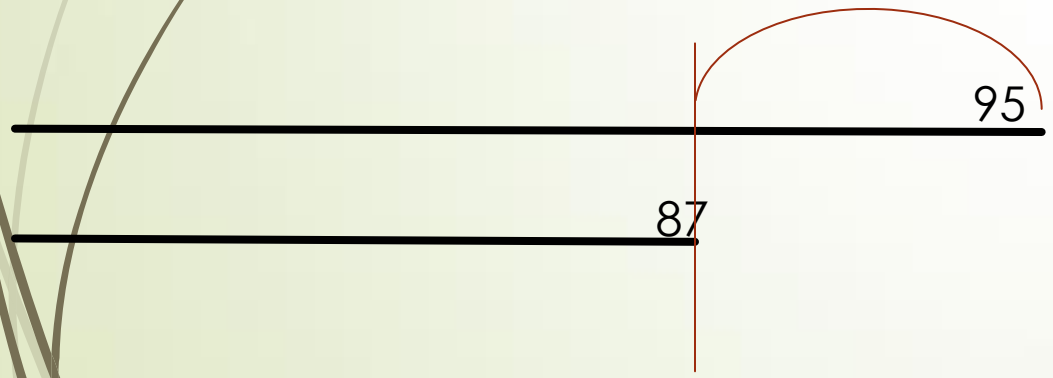
Secure numberbonds are as important with subtraction.

95 + 8 = (95 - 5 – 3) = 87

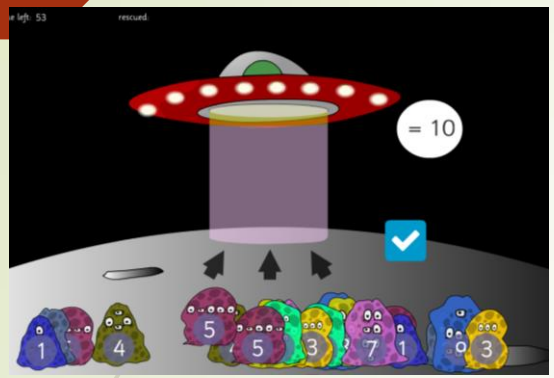
Subtraction as minus



Subtraction as difference

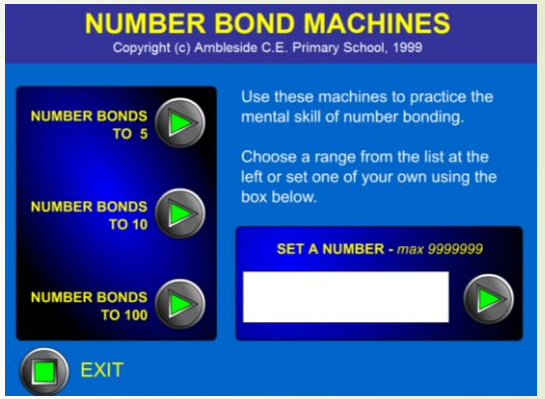


Supporting number bonds



http://www.iboard.co.uk/iwb/Alien-Pairs-to-10-733

http://mathsframe.co.uk/en/resources/resource/37/placing_numbers_on_a_number_line



http://www.amblesideprimary.com/ambleweb/mentalmaths/numberbond.html

Adding playing cards.
Play pontoon, every card turn add by bridging through 10.

Multiplication and division can be challenging.

Earliest experience of both comes through grouping, lots of and sharing.

Barriers to understanding is that we talk in terms of x smaller, children assume x gives bigger results and ÷ gives smaller results.

For example: 5.6 is 10 x smaller than 56.

Number facts: knowing our tables.

Knowing times tables, with their related division facts is important. Ability to recall them help children make mathematical statements and build connection between different areas of mathematics:

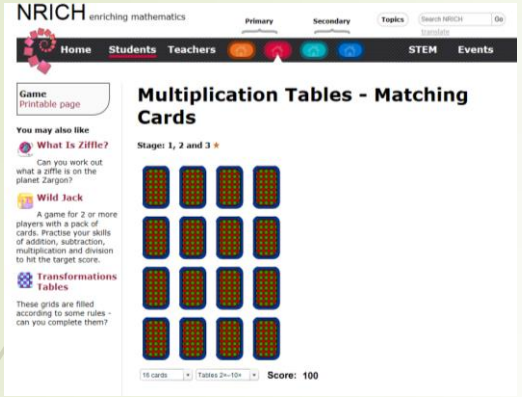
7x8=56

Therefore we know that:
0.7x8=5.6

So why is 0.7x0.8=0.56?

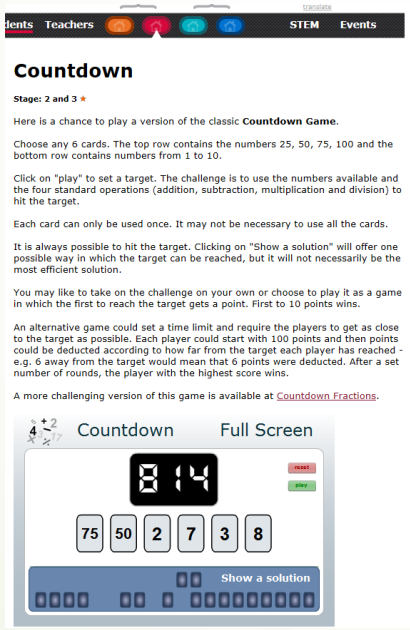
"0.7 is 10x smaller than 7 and 0.8 is 10x smaller than 8, 10x10 is 100 therefore the answer of 0.7x0.8 has to be 100x smaller than 7x8." (A year five child summer term 2016).

Number facts at home



http://nrich.maths.org/1252

Any random number generator and play quick multiplication: ie two dice, three playing cards



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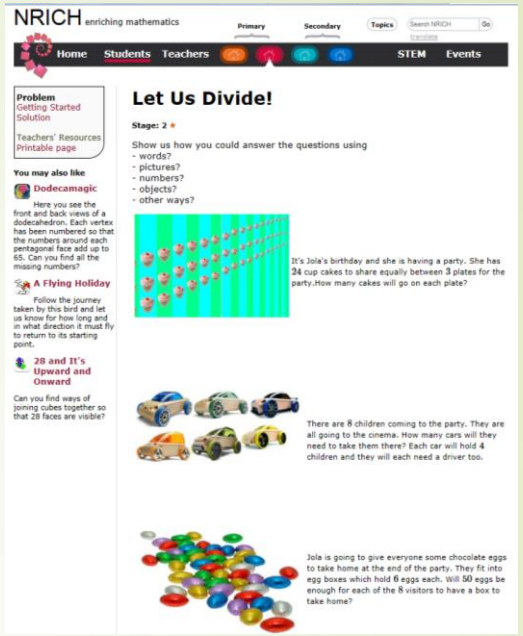

http://nrich.maths.org/8308

http://nrich.maths.org/951

Further websites to support mathematics:

- http://nrich.maths.org/frontpage - loads of games, puzzles, problems on all mathematical concepts from early years to secondary school (please only use the student site).
- http://www.activityvillage.co.uk/arithmagons-medium-2 -Maths arithmagons – number patterns and problems
- http://resources.woodlands-junior.kent.sch.uk/maths/countdown/ Countdown game (does not offer solutions)
- http://www.sumdog.com/ - all KPS children have a log in for the content you would otherwise need to pay for. Interactive challenges, play against the programme or other children internationally.
- http://www.mathsisfun.com/index.htm Lots of things, I like their puzzles!

Bibliography:

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http://nrich.maths.org/content/id/7209/NRICH-poster_DiceyOperations.png
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Babcock LDP Primary Maths Team adapted from Haylock and Cockburn 1989