What we will cover in the session:

- What does challenge look like in mathematics?
- How can we all learn maths with real understanding?
- How you can support your children to become true mathematical thinkers

Maths statements – true/ false/ sometimes

- **Some people are born with a maths brain.**
- **To be good at maths you have to be fast.**
- **If you don’t understand something you should learn a method.**

Susan Bolan: Stanford Universtity.

What do we mean by mastery?

The essential idea behind mastery is that all children need a deep understanding of the mathematics they are learning so that: future mathematical learning is built on solid Foundations.

Aims: Mathematics Curriculum

Aims

The national curriculum for mathematics aims to ensure that all pupils:

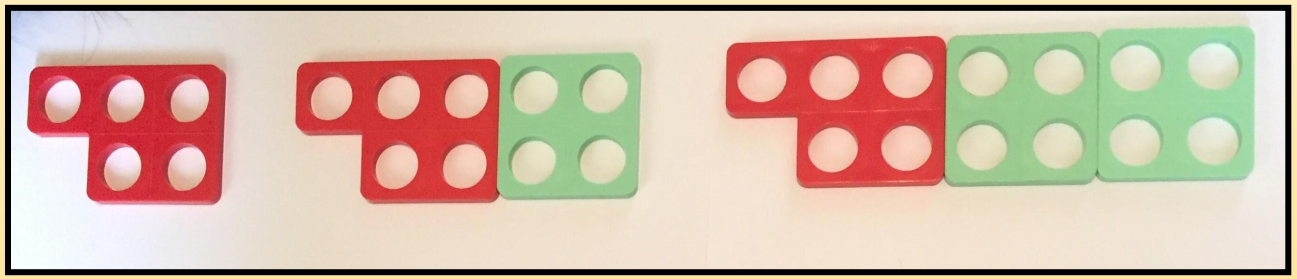
- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason mathematically** by following 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.

A pupil **REALLY** understands a mathematical concept, idea or technique if he or she can:

- describe it in his or her own words;
- represent it in a variety of ways (e.g. using concrete materials, pictures and symbols – the CPA approach);
- explain it to someone else;
- make up his or her own examples (and non-examples) of it;
- see connections between it and other facts or ideas;
- recognise it in new situations and contexts;
- make use of it in various ways, including in new situations.

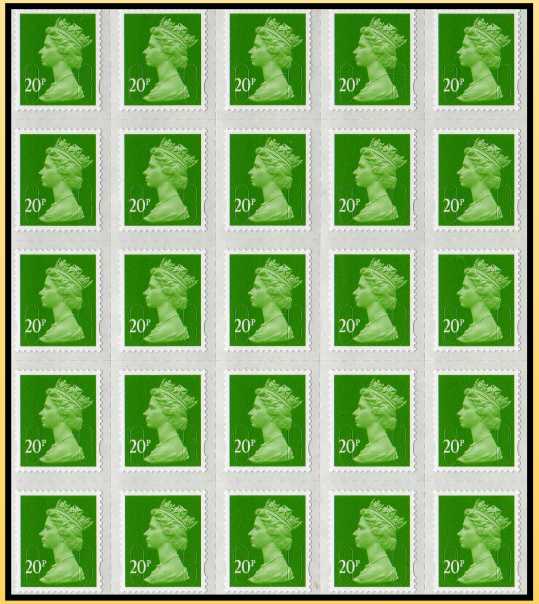
Teaching for mastery: a set of pedagogic practices that keep the class working together on the same topic, whilst at the same time addressing the need for all pupils to master the curriculum and for some to gain greater depth of proficiency and understanding.

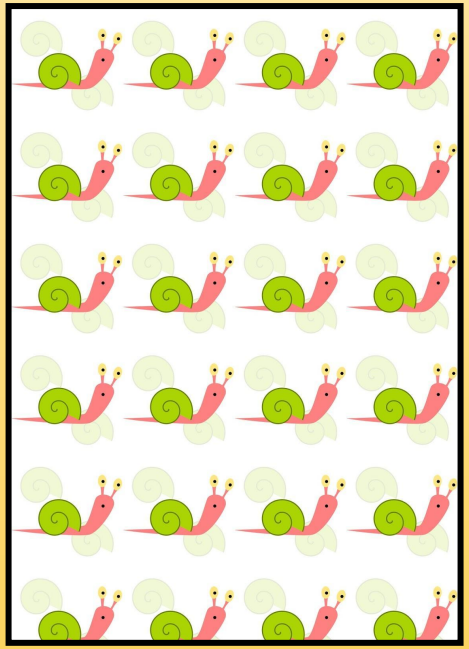
What does challenge look like in maths lessons?



Ten students will stand on a circle. No two students standing next to each other can both have blond hair.

What is the greatest number of students that could have blond hair?

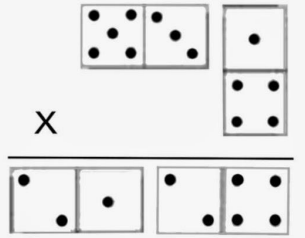




Multiplication Dominoes

(from The Moscow Puzzles, B. Kordemsky)

The four dominoes below were arranged to make a multiplication problem.



How many different multiplication problems can you make with a set of dominoes, using each domino only once? (It is possible to use a complete set of 28 dominoes to make 7 multiplication problems.)

What does challenge <u>not</u> look like in maths lessons?

NAME _____
Math Assignment

MathGen 1.0

-348 + 90	538 + 440	424 + 476	-716 +-156	-807 + 129
747 +-513	858 +-150	-617 +-266	-693 + 607	-138 +-500
-249 +-620	-280 +-103	-854 - -62	324 --249	-716 - 122
274 - 889	-792 --370	607 --179	-682 - 190	267 - -40
772 - 849	216 - 194	-602 - 250	273 --657	197 --583

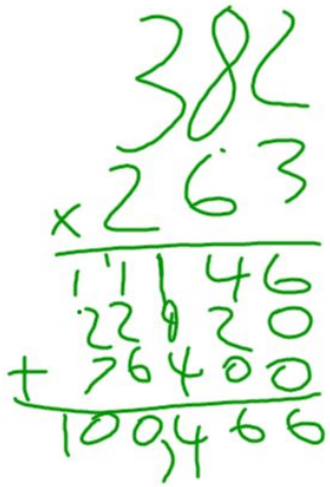
MathGen 1.0 www.MathGen.com

(4) 32 × 56 = 32×6 + 32×5

(5) 32 × 65

(7) 32 × 51

(8) 32 × 61



add 11146 + 22920+ 76400 and put the answer under the addition bar

Name: _____ Division: 3-Digit Dividends; 2-Digit Quotients

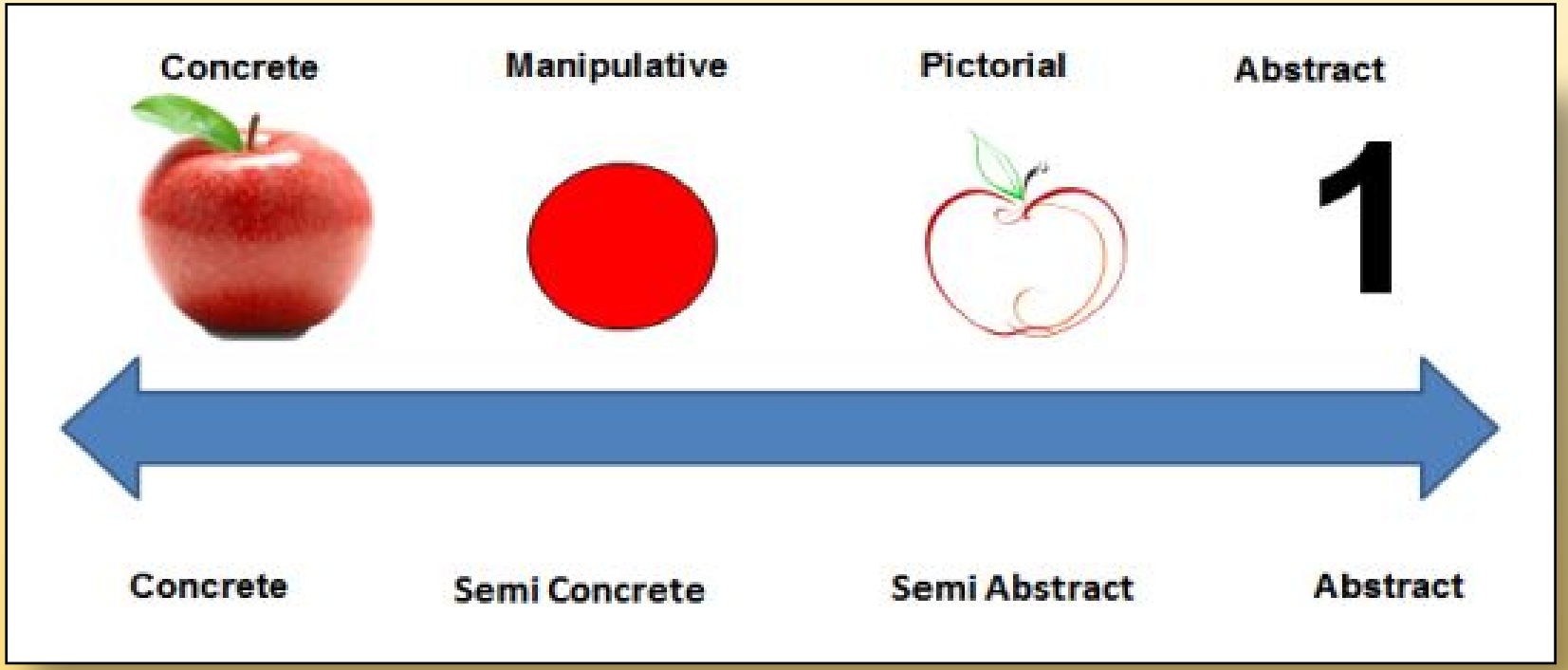
Graph Paper Division

a. 6 1 2 6 b. 3 1 5 8 c. 2 1 1 3

d. 3 2 6 9 e. 4 1 9 5 f. 6 2 4 9

g. 7 1 8 6 h. 9 1 9 8 i. 3 2 0 8

Super Teacher Worksheets - www.superteacherworksheets.com


Concrete
Manipulative
Pictorial
Abstract
1
Concrete
Semi Concrete
Semi Abstract
Abstract

Christopher has 3 cars. Charlie gives him 1 more. How many does Christopher have now?

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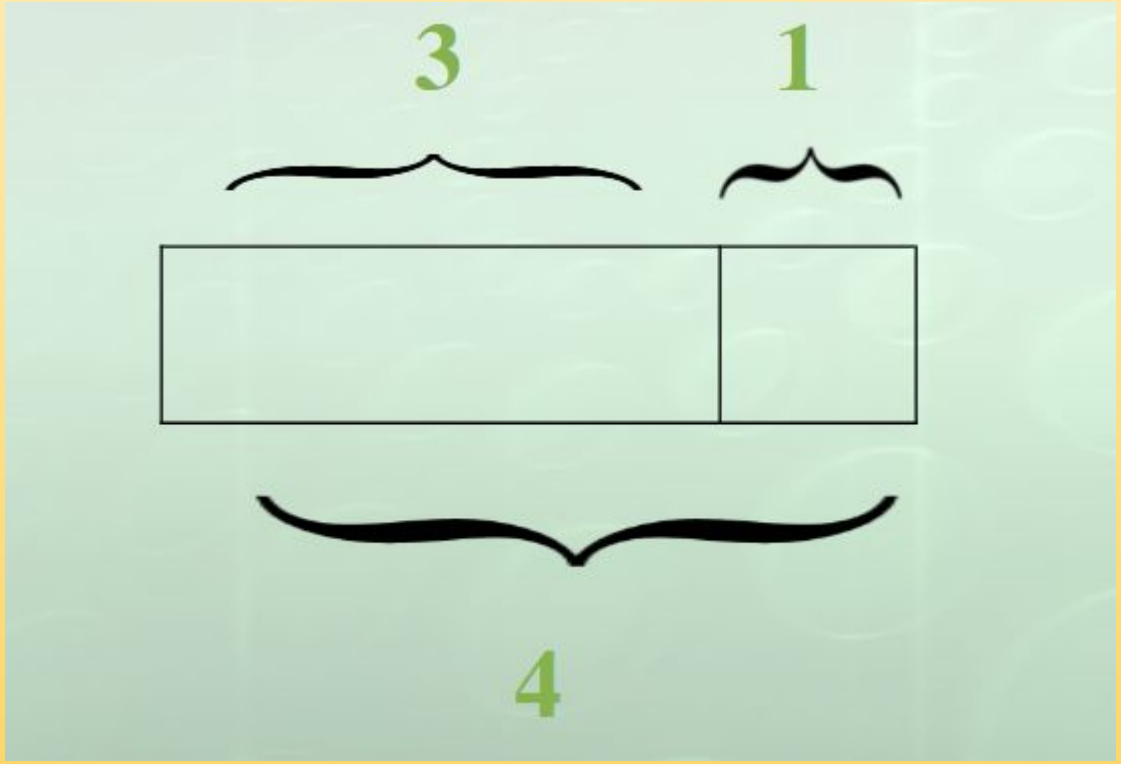


3 + 1 = 4

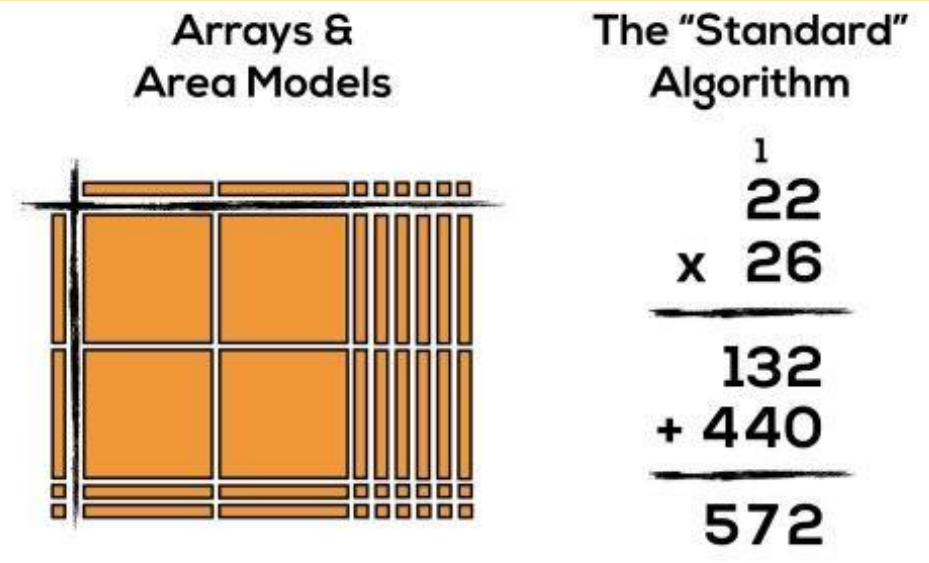
Informal to formal multiplication

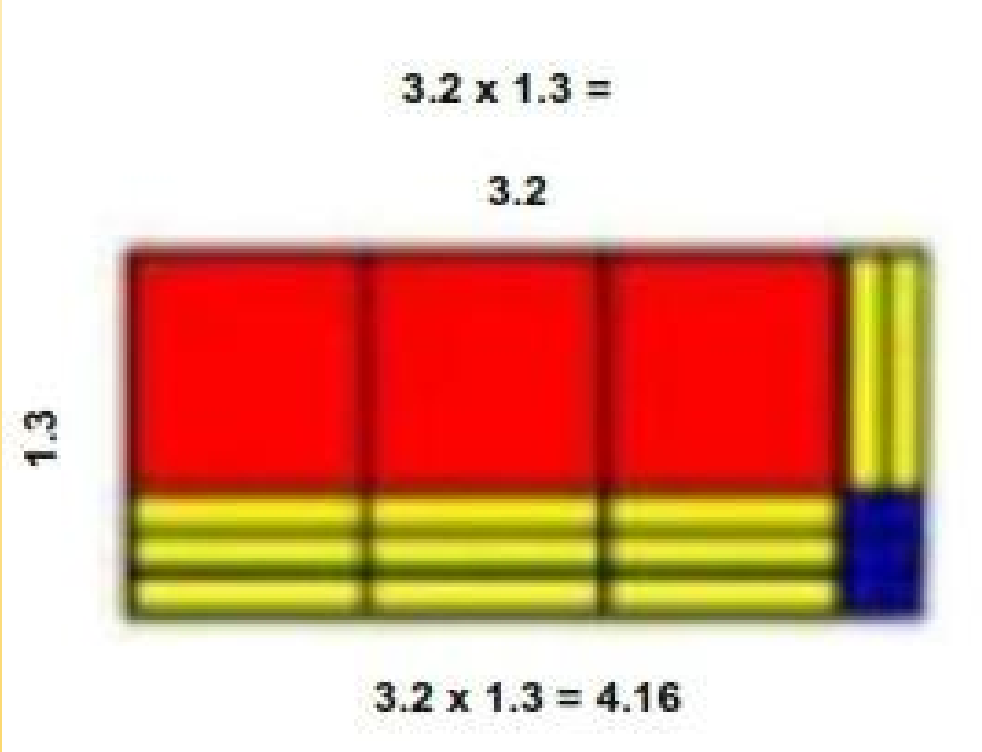
10 x 5 = 50	3 x 5 = 15

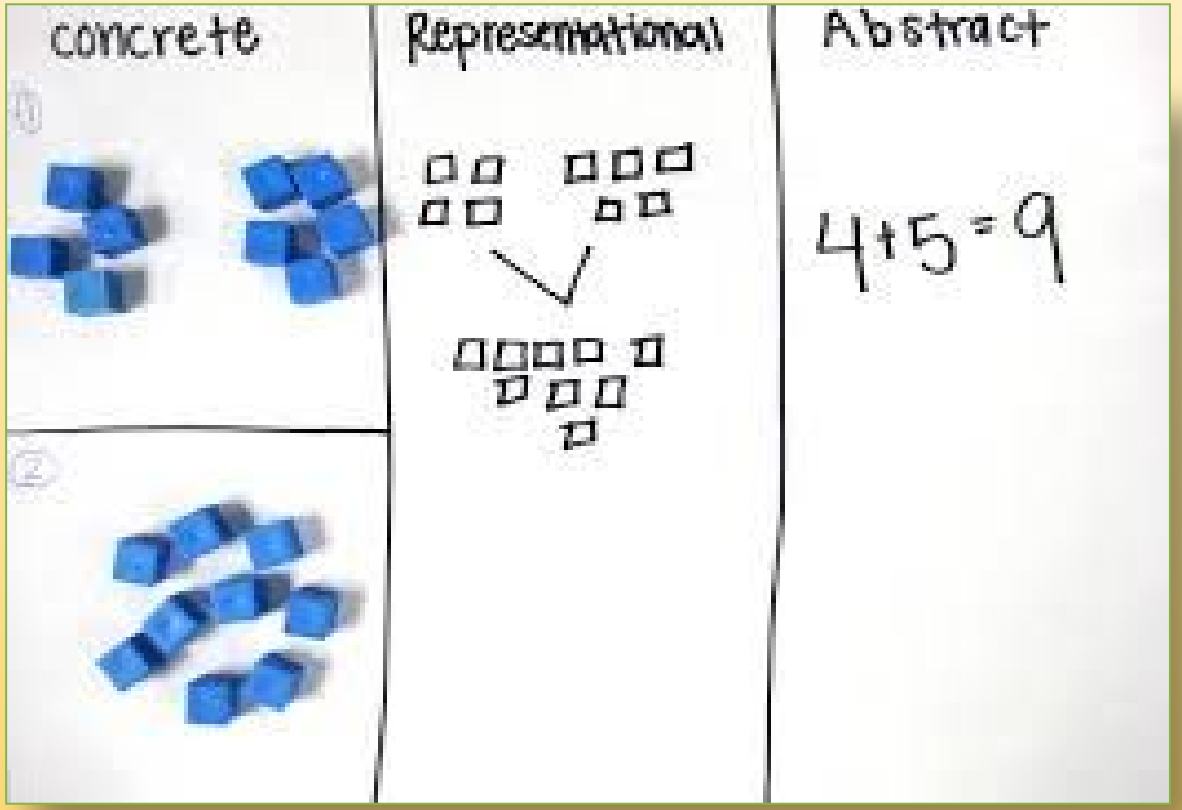
$$\begin{array}{r} 13 \\ \times\ 5 \\ \hline \\ \hline \\ \hline \end{array}$$

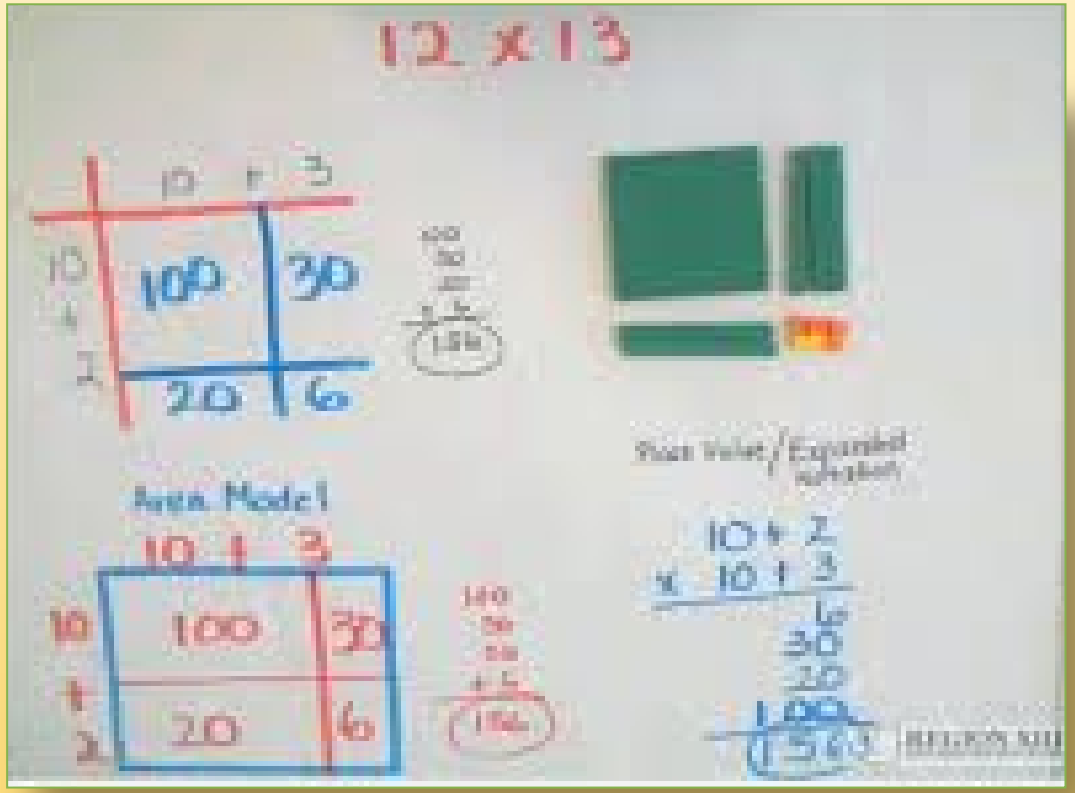
$$\begin{array}{r} 13 \\ \times\ 5 \\ \hline \\ \hline \end{array}$$

2 by 2 digit and decimal multiplication



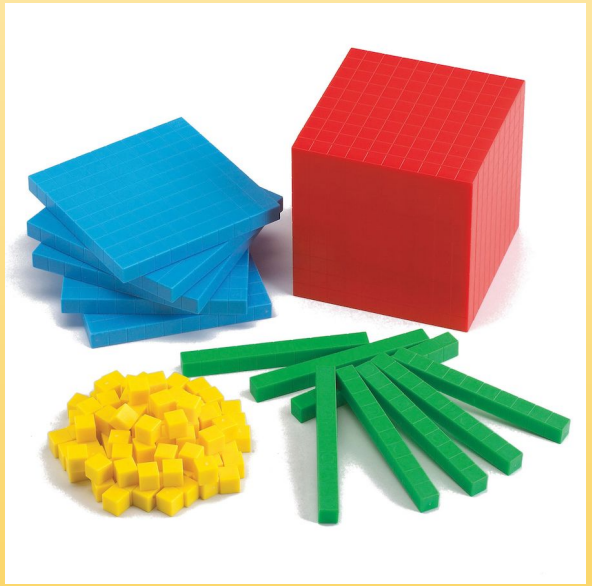



concrete
Representational
Abstract
4+5=9

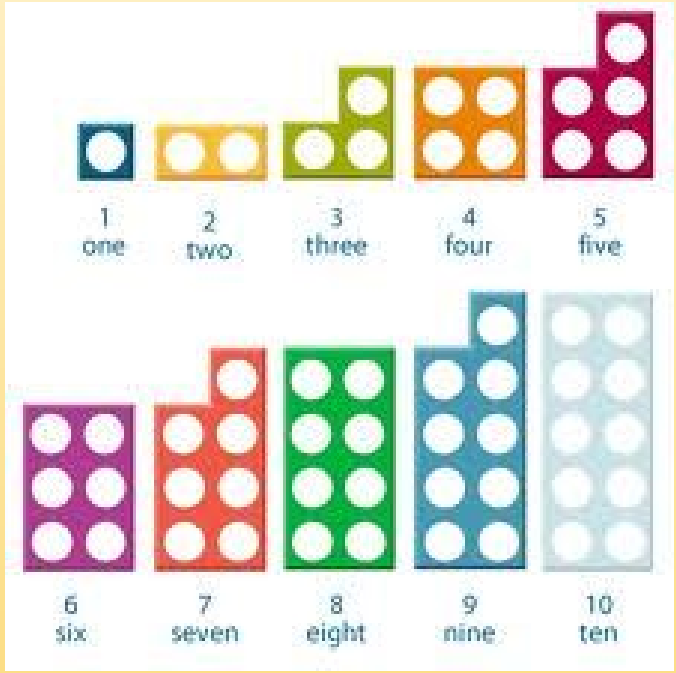

12 x 13
10 + 3
10
+
2
100
30
20
6
Area Model
10 + 3
10
+
2
100
30
20
6
10 + 2
x 10 + 3
30
20
100
563

Concrete equipment:

Dienes (Base ten) Blocks

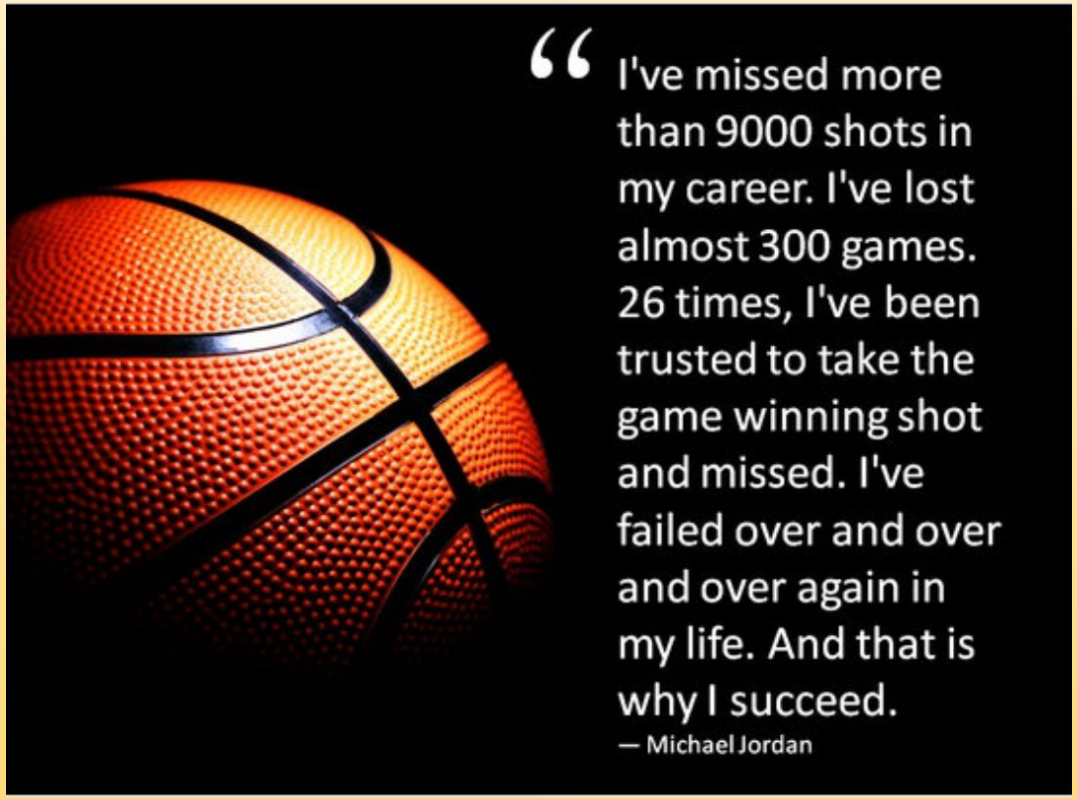
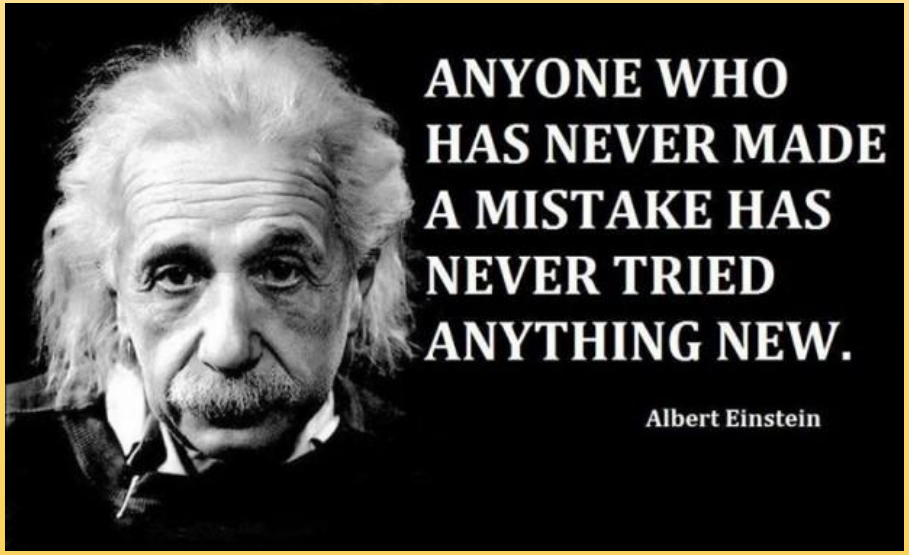


Numicon



Counters

Cubes

Cuisinaire

Mistakes are important