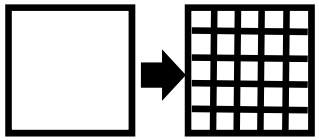
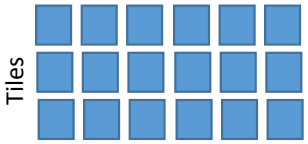


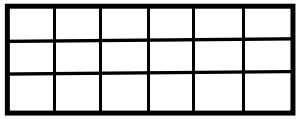
Multiplication starts when students are asked to partition a square 5 by 5.

Repeated addition = Multiplication
5 x 5 = 25

Students will construct arrays using square tiles or any manipulative. .



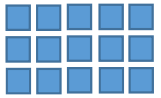
When students create the concrete representations they should also be drawing visual representations as well



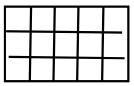
× ÷

Relational Thinking

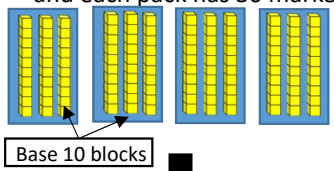
$15 \div 3 = \square$
$3 \times \square = 15$
$? = 5$



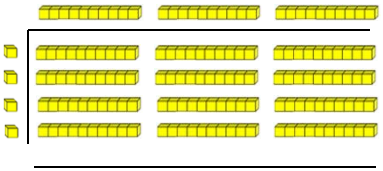
Use concrete representations to draw understanding and build concepts



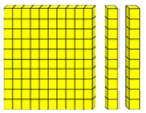
Example Problem:
There are 4 packs of markers and each pack has 30 markers



Create an array / Area model

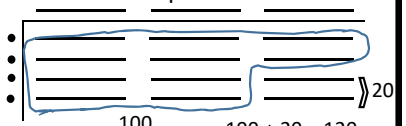


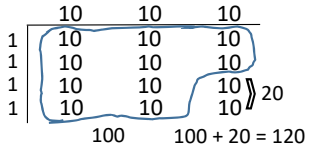
Then group

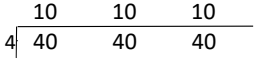


120 or 12 tens

Pictorial Representation



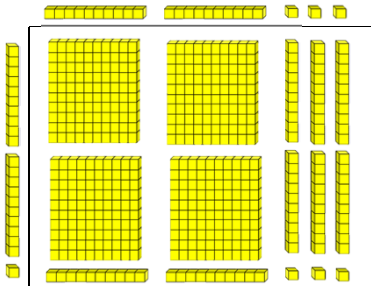




40 x 3 = 120

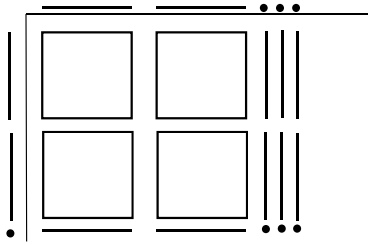
This is where we start to see an increase in students efficiency in thinking.

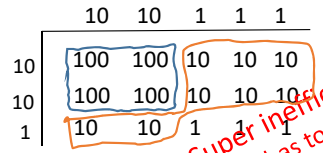
21 x 23



100 x 4 = 400
10 x 8 = 80
1 x 3 = 3
400 + 80 + 3 = 483

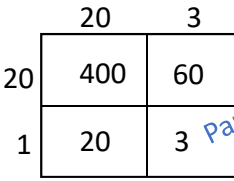
Pictorial Representation





Super inefficient
There has to be a better way!

400 + 80 + 3 = 483



Partial Products

400 + 60 + 20 + 3 = 483

Keep increasing the efficiency and maintain the accuracy

Multiplication Progression

23
x 21
3 (1 x 3)
20 (1 x 20)
60 (3 x 20)
400 (20 x 20)
483

Students have built **conceptual understanding** and now starting to understand **procedurally.**

23
x 21
23 (1 x 23)
460 (20 x 23)
483

Students will start to develop more efficient ways of thinking abstractly.

You may choose to go into a standard algorithm at this point but it is not required!

Created by: Jeff Mikulin
Adapted from: Graham Fletcher