

# Big Ideas in Number Resource Information

Big Ideas in Number Focus Area: **Multiplicative Thinking**

Name of Game or Activity: **Distributive Property Multiplication**

## Instructions:

Students use the Rectangular Array board to complete multiplication of 2 digit numbers. It supports students by giving them a visual model to support mental processes.

- Identify multiplication problem e.g.  $4 \times 13$  to begin with.
- Students create rectangular arrays on worksheet to subdivide problem ( $4 \times 10$ ) and ( $4 \times 3$ ).
- Record the number of stars in each rectangle and find the sum of both rectangles:  $40 + 12 = 52$ .
- It may be appropriate for students to 'count' or think additively to begin with, then work towards multiplicative thinking as confident and trust in distributive property increases.
- Have discussions what splits may be more convenient than others, such as ( $4 \times 10$ ) and ( $4 \times 3$ ) rather than ( $4 \times 7$ ) and ( $4 \times 6$ ).
- Extend student thinking into 2 digit  $\times$  2 digit numbers.
- $15 \times 18$  could be distributed as  $(10 \times 10) + (10 \times 8) + (10 \times 5) + (5 \times 8)$

## Resources:

- Rectangular Array board or Rectangular Array (10 X 10) board.
  - Laminated or in plastic sleeve for re-using purposes.

## BiIN Micro Content

<b>Cyclical pattern of 100-10-1 is repeated from ones to thousands</b>	
<b>Cyclical pattern of 100-10-1 is repeated beyond 100s to millions</b>	
<b>Ten times multiplicative relationship exists between places</b>	
<b>The multiplicative relationship extends to numbers less than one, that is to the right of the decimal point</b>	
<b>There is symmetry in the place value number system based around the ones place so that the patter in naming wholes is reflected in naming decimals</b>	

## Big Ideas in Number Resource Information

Double count by representing one group (e.g. hold up 4 fingers) and counting repetitions of that group, simultaneously keeping track of the number of groups and the number in each group	
The multiplicative relationship between quantities is expressed as 'times as many' and 'how many times larger or smaller' a number is than another number	
Numbers move a place each time they are multiplied or divided by 10	
Basic number facts to 10x10 are recalled and patterns in number facts are investigated	
Number facts can be extended by powers of 10	
Multiplicative situations can be represented as equal-groups problems, comparison problems, combinations (Cartesian) problems and area/array problems	
The multiplicative situation is understood (factor X factor = multiple) with the meanings of the terms clearly understood.	
Multiplication arrays are used to visualise and represent multiplication situations	
Division and multiplication are known as the inverse of one another	
The commutative property of multiplication is understood and can be shown to be linked to arrays	
Partition division involves finding the size of each group and quotient division involves finding the number of groups and can be also expressed in terms of factors and multiple	
Quotient division can be considered in terms of fractions so that a quantity can be split by 'halving', 'thirthing', 'fifthing' etc.	
Prime and composite numbers can be linked to multiplicative arrays – prime numbers can be made only with a single row array	
Distributive property of multiplication over addition is applied and shown by a multiplicative array	
Multiplicative arrays are linked to the concepts of area and volume	
Measurement units have the same multiplicative relationship as the Base 10 system	
Cartesian products can be represented symbolically and in tree diagrams	



