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

Name of Game or Activity: **Flip Tile Arrays**

Instructions:

* Students are asked to make “as many **different** rectangular arrays” for given numbers as they can using a set number of flip tiles. For example: 12 or 24. (NB an array has **no** spaces between its parts/square tiles.)
* These arrays can be drawn or traced in student workbooks or scrap books. Graph books can be used for accuracy and ease of representation of arrays.
* Arrays are labelled to show the number of rows and columns of tiles, or the factors of the numbers. For example: 3 rows of 4 tiles equals 12 tiles, or 2x6=12
* Arrays can be coloured by students or patterns can be shown, graphically.
* Once students are familiar with the task and the range of factors that some numbers have, other numbers can be investigated. For example, 18 or 36. (NB. Square numbers can be identified by their “special” arrays.
* Arrays can be used to show partitioning or division, or fractions of collections. For example: 12÷3=4 or Half of 12 equals 6.

Resources: Flip tiles or unifix or multilink cubes can be used. Student workbooks-graph books or scrap books.

**BIiN Micro Content**

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| **Cyclical pattern of 100-10-1 is repeated from ones to thousands** |  |
| **Cyclical pattern of 100-10-1 is repeated beyond 100s to millions** |  |
| **Ten times multiplicative relationship exists between places** |  |
| **The multiplicative relationship extends to numbers less than one, that is to the right of the decimal point** |  |
| **There is symmetry in the place value number system based around the ones place so that the pattern in naming wholes is reflected in naming decimals** |  |
| **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 communitive property of multiplication is understood and can be shown to be linked to arrays** | **✓** |
| **Partition division involves finding the size of each group and quotition division involves finding the number of groups and can be also expressed in terms of factors and multiple** | **✓** |
| **Quotition division can be considered in terms of fractions so that a quantity can be split by ‘halving’, ‘thirding’, ‘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 or 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** |  |