LEVEL: Year 2	CONTENT: Number & Algebra	FOCUS: Multiplication
In the Classroom		

PURPOSE	• Accurately estimate a collection of objects • Explain ways to improve an estimation • Record numbers using drawings, words and numerals • Use objects to create an array • Recognise that all numbers will have more than one array • Use numbers to label and describe arrays • Represent arrays as repeated addition • Use symbols to record number facts • Understand the relationship between facts, e.g. 3 x 4 = 4 x 3 and the way their arrays are represented
WARM UP	**Elmer the Elephant** Read text, Elmer the Elephant and talk about the number of coloured squares covering Elmer's body.
INTRODUCTION	Brief introduction to Good Mathematicians – make a list and place on the board, include teamwork, asking questions, sharing ideas, recording ideas, explaining thinking, persistence, checking solutions and learning from mistakes.
EXPLICIT TEACHING & LEARNING	**Cupcakes on a Tray** Anna is going to a party and needs to take 24 cupcakes. She has a rectangular tray. How could she arrange the cupcakes on her tray? *Note*: The size of the rectangular tray is not shared, students need to decide this information. After each student has arranged their cupcakes – stop and do a gallery walk – what do students see? Notice? Wonder? **Challenge** At the party there are 8 people. How many cupcakes does each person get? 6 cupcakes were put onto smaller plates. How many plates were used for all the cupcakes?
DISCUSSION/KEY QUESTIONS	• How many objects do you think are in your bag? • What is a good estimate? Why? • What information can you use to help you? • What do we know about Anna's problem? • What size is the tray? • What do we know about the tray? • Can you arrange your cupcakes in another way? • Can you use an array? • Can you label your arrangement? • What words do we use to describe your arrangement? • Can you represent your arrangement in numbers? • Can you use repeated addition? • Can you split your arrangement in some way and represent it in numbers?
DELIBERATIVE PRACTICE	The focus of this activity is to discover if students can represent objects as an array. Once in an array, it will be important to note how students are finding the total. Are they counting all, skip counting or using known facts? Students may also need to be shown how to read, create, draw, label and interpret arrays.
REFLECTION	Reflect on how placing items in an array can help us to find totals. Also reflect as a class on students who were a Good Mathematician and why – have students nominate one another. Remind students of list created at the beginning of the lesson.
RESOURCES	Cupcake squares (pdf file)

Curriculum Connections	
CONTENT	**NSW Syllabus Mathematics K-10 – Stage 1.2** **Area 2** Compare and order several shapes and objects based on area using appropriate uniform informal units (ACMMG037) • draw the spatial structure (grid) of repeated units covering a surface • explain the structure of the unit tessellation in terms of rows and columns (Communicating) • compare and order the areas of two or more surfaces that cannot be moved, or superimposed, by measuring in uniform informal units • predict the larger of two or more areas and check by measuring (Reasoning) • record comparisons of area informally using drawings, numerals and words, and by referring to the uniform informal unit used
WHAT CAME BEFORE	Using objects to cover an area may not be new to the students, but what is important here is the method the students are using to find the total. It is also important for students to understand that the units being used to measure the area need to be uniform, i.e. of equal size and shape.
WHAT COMES NEXT	Gradually moving students from simply covering a given area with uniform units, to creating an array to cover the area. From here we want students to use their knowledge of skip counting an known facts in order to calculate the total.
VOCABULARY	estimate, count, arrange, groups of, sharing, arrays, multiplication, divide, rows, columns, symbols, commutativity, distributive property
MISCONCEPTIONS	When using objects to cover a given area, it is important that the objects are the same size. Students need to be conscious of gaps and overlaps when laying out the objects. If only a small number of objects are available to cover the chosen area, it is important students understand how to iterate (i.e. use the same object repeatedly to find the area (length, height, etc.).
WHAT PROFICIENCIES ARE TO BE UTILISED? **Understanding** **Fluency** **Problem Solving** **Reasoning** **Communicating (NSW)** **Justifying (NSW)**	**Year 2 (Australian Curriculum)** **Understanding** includes connecting number calculations with counting sequences, partitioning and combining numbers flexibly and identifying and describing the relationship between addition and subtraction and between multiplication and division **Fluency** includes readily counting numbers in sequences, using informal units iteratively to compare measurements, using the language of chance to describe outcomes of familiar chance events and describing and comparing time durations **Problem-solving** includes formulating problems from authentic situations, making models and using number sentences that represent problem situations, and matching transformations with their original shape **Reasoning** includes using known facts to derive strategies for unfamiliar calculations, comparing and contrasting related models of operations and creating and interpreting simple representations of data. **NSW Syllabus Mathematics K-10 – Stage 1.2 Outcomes** • describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols • supports conclusions by explaining or demonstrating how answers were obtained • measures, records, compares and estimates areas using uniform informal units
ASSESSMENT	After students have covered the area of their chosen object, observe and make note of the strategy being using to count the number of objects. Are students counting all, skip counting, using known facts or a combination of these?