ILLUSTRATING THE MATHEMATICS STANDARDS

The following examples of student work illustrate achievement at the mathematics standards for years 1, 2, and 3.

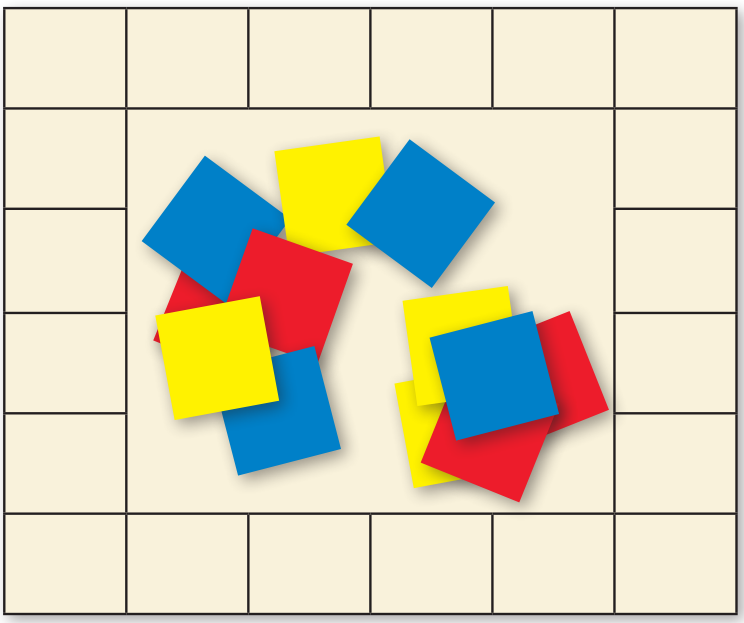
Tiled Photo Frames

The task used in this illustration was part of a whole-school focus on Algebra and allowed students to explore sequential patterning for photo frames.

The task relates to achievement objectives for Number and Algebra from the mathematics and statistics learning area in *The New Zealand Curriculum*.

Tiled Photo Frames

Use tiles and a photo-frame template to design a pattern for a photo frame. Explain your pattern.



Some features of students' work used to make judgments in relation to the mathematics standards are described below.

ILLUSTRATING THE MATHEMATICS STANDARD

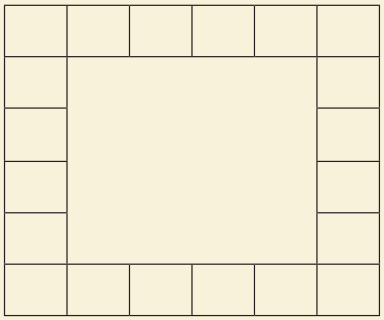
Tiled Photo Frames

New Zealand Curriculum: Level 1	*Mathematics Standard: After one year at school*
In solving problems and modelling situations, students will:	
Number and Algebra • *use a range of counting ... strategies with whole numbers ... (number strategies)* • *create and continue sequential patterns (patterns and relationships)*	*Number and Algebra* • *apply counting-all strategies* • *continue sequential patterns ...*

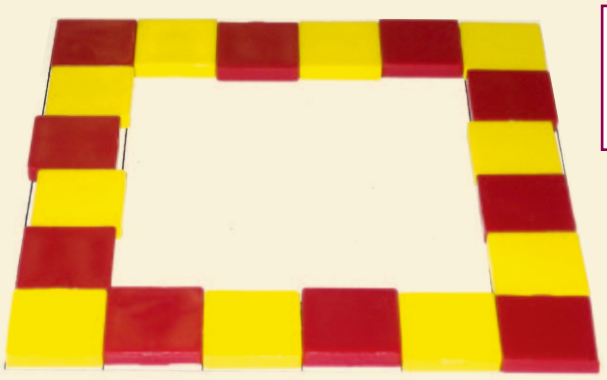
Meri chose to use red and yellow tiles for her frame.

1, 2, 3, 4, ... 20

She worked out how many tiles she needed by counting the empty spaces one at a time.



Meri alternated the red and yellow tiles. She described her pattern.



Meri worked out how many red tiles she had used by counting them one by one. As she counted, she pointed to each red tile.

1, 2, 3, 4, ... 10

Red-yellow-red-yellow all the way around.

Discussion

This task provides some of the evidence needed to show that Meri is achieving at early curriculum level 1 and the year 1 standard in Number and Algebra. She has demonstrated that she is able to create and continue a sequential pattern and to count all the objects in a set, which suggests that she is working at the Counting from One on Materials stage of the Number Framework.

ILLUSTRATING THE MATHEMATICS STANDARD

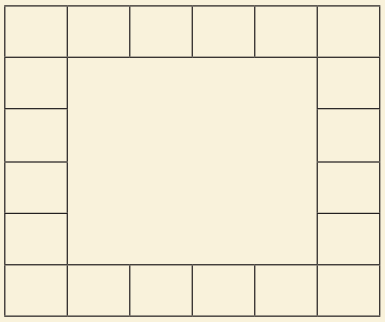
Tiled Photo Frames

New Zealand Curriculum: Level 1	*Mathematics Standard: After two years at school*
In solving problems and modelling situations, students will:	
Number and Algebra • *use a range of counting [and] grouping … strategies with whole numbers … (number strategies)* • *create and continue sequential patterns (patterns and relationships)*	*Number and Algebra* • *apply … skip-counting and simple grouping strategies to combine … whole numbers* • *create and continue sequential patterns by identifying the unit of repeat*

Vilina chose to use blue and yellow tiles for her frame.

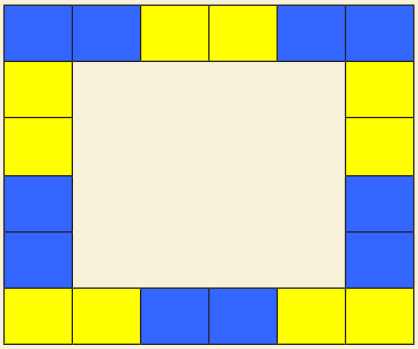
Vilina worked out how many tiles she needed by touching the empty spaces, two at a time, as she counted them.

2, 4, 6, 8, … 20.



Vilina placed her tiles in pairs of blue and yellow. She identified the repeating unit.

It goes in two lots of 2. Blue, blue, yellow, yellow.



To work out how many blue tiles she had used, Vilina touched each pair as she counted them.

2, 4, 6, 8, 10. And there are 10 yellows too.

Discussion

This task provides some of the evidence needed to show that Vilina is achieving at curriculum level 1 and the year 2 standard in Number and Algebra. She has demonstrated that she is able to create and continue a sequential pattern using a unit of alternating pairs and to use skip-counting to count all the objects in a set, which suggests that she is working at the Advanced Counting stage of the Number Framework.

ILLUSTRATING THE MATHEMATICS STANDARD

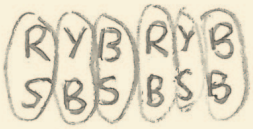
Tiled Photo Frames

New Zealand Curriculum: Level 2	*Mathematics Standard: After three years at school*
In solving problems and modelling situations, students will:	
Number and Algebra • *use simple additive strategies with whole numbers … (number strategies)* • *find rules for the next member in a sequential pattern (patterns and relationships)*	*Number and Algebra* • *apply basic addition facts to:* – *combine or partition whole numbers* • *create and continue sequential patterns with one or two variables by identifying the unit of repeat*

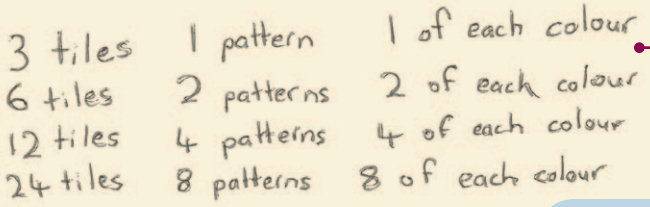
The teacher added to the task question by asking the students to use two variables when creating a pattern for their photo frame. The students had to work out how many tiles of each colour and how much other material they needed for their frame before they got the materials from the equipment table.

Let's have 24 tiles and make the colour pattern red, yellow, blue.

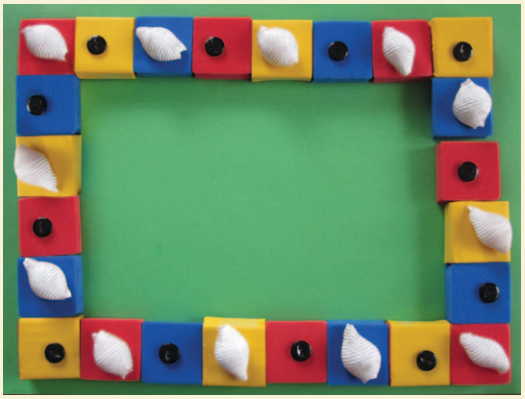
Miles and Iosua decided that they would have 24 tiles in their frame and use shells and buttons to create a second variable. They used repeated doubling to work out how many tiles they needed of each colour and the number of shells and buttons.



We can go shell, button, shell, button until the end. That's 3 shells and 3 buttons on 6 tiles. So that's 6 shells and 6 buttons on 12 tiles and 12 shells and 12 buttons on 24 tiles.



If you count from a red tile with a white shell on it, it takes six tiles before a red tile with a white shell on it comes round again.



Miles and Iosua identified the unit of repeat.

That's the start of the next repeat of the pattern. It's the same wherever you start counting the 6 tiles pattern from.

Discussion

This task provides some of the evidence needed to show that Miles and Iosua are achieving at early curriculum level 2 and the year 3 standard in Number and Algebra. They have demonstrated, by identifying the unit of repeat, that they are able to create and continue a sequential pattern with two variables (colour and object). They are able to use a simple additive strategy (doubling) and their knowledge of basic addition facts to combine and partition whole numbers, which suggests that they are working at the Early Additive stage of the Number Framework.