How many tiles?

Reasoning in the classroom

Year 2
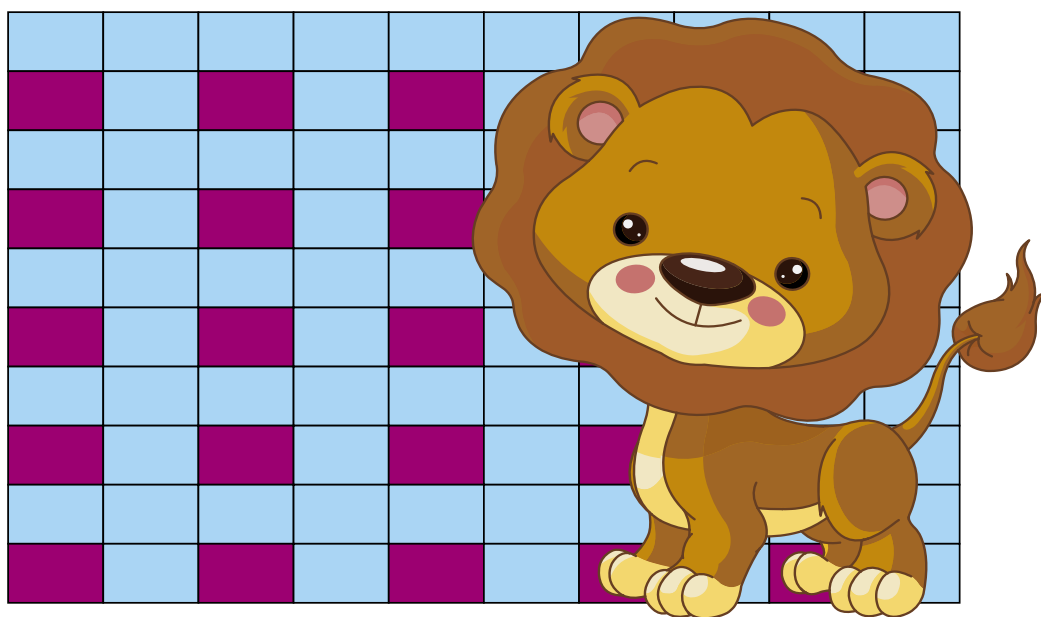
Support materials for teachers

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Year 2 Reasoning in the classroom – How many tiles?

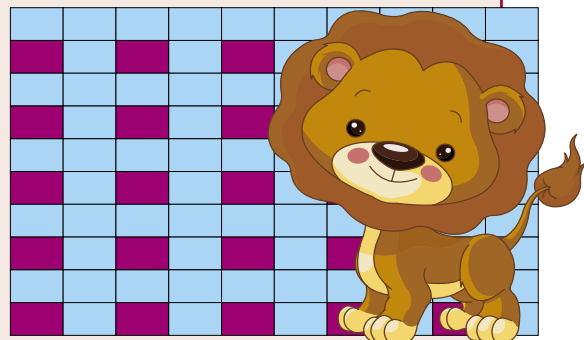These Year 2 activities support learners in understanding the meaning of multiplication.

Activity 1

How many tiles?
Learners use their reasoning skills to work out the number of tiles on a partially hidden grid.
Includes:
- How many tiles? question
- Markscheme

Activity 2

Making patterns
They use the 5- and 10-times tables to make patterns on grids.
Includes:
- Explain and question – instructions for teachers
- Whiteboard – Wall
- Resource sheet – Our wall

Reasoning skills required

Identify	**Communicate**	**Review**
Learners select the mathematics to use.	They explain their methods and form number sentences, using multiplication, to describe patterns.	They check their work.

Procedural skills

- **Multiplication**
- **Addition and subtraction**

Numerical language

- **Altogether**
- **Pattern**
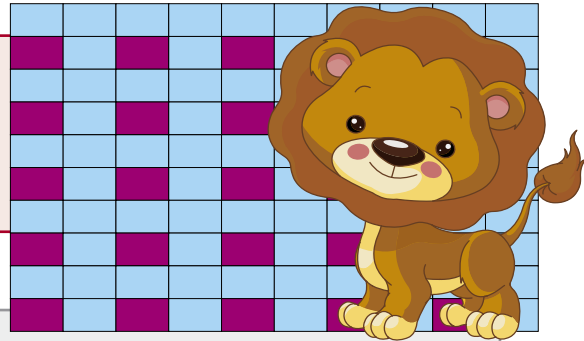- **Multiplication**
- **Grid**

How many tiles?

Activity 1 – How many tiles?

Outline

This activity requires learners to find their own method to work out how many tiles are within a partially hidden grid.

You will need

Q

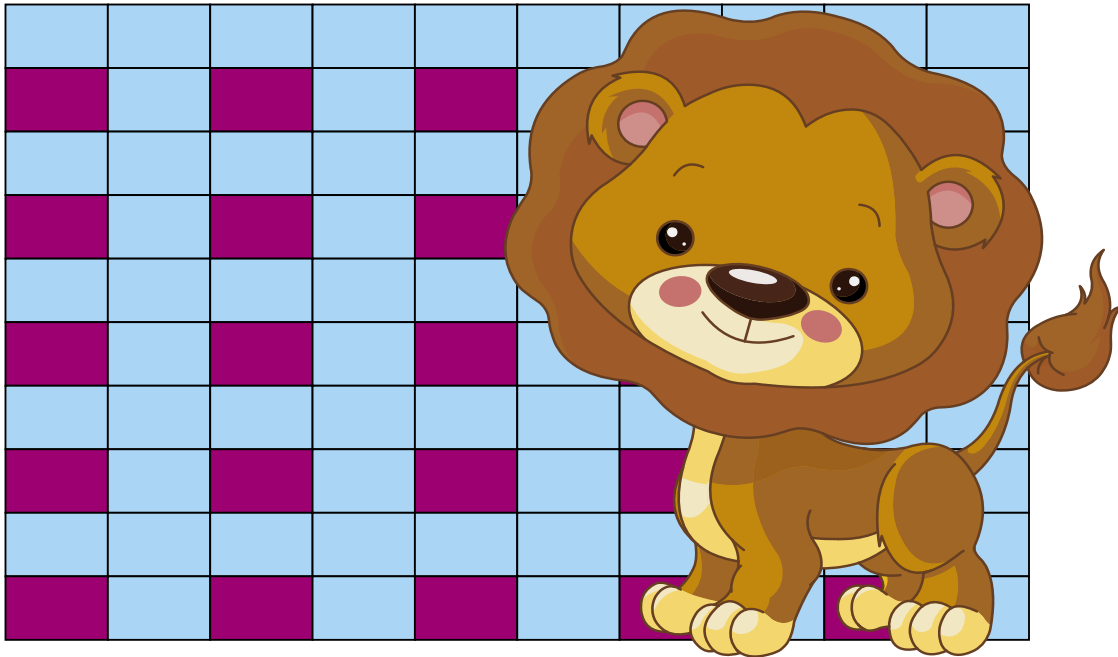**How many tiles? question**
One page for each learner

M

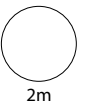**Markscheme**

There are tiles on this wall.

The lion is in front of some of them.

Altogether, how many **blue** tiles are on the wall?

blue tiles

2m

Activity 1 – How many tiles? – Markscheme

Marks	Answer
2m	**75**
Or 1m	Shows groupings that would lead to 75 if calculated correctly, e.g. • 5 lots of 10 and 5 lots of 5 • 10 + 10 + 10 + 10 +10 + 5 + 5 + 5 + 5 + 5 • 10 lots of 10 take away 5 lots of 5

Activity 1 – How many tiles? – Exemplars

> I counted 10 across and I counted 10 down and I know that 10 x 10 = 100 because that is the 10 times table so then I counted how many red tiles there would be what is 25 then I did take away 25 and that is 75
>
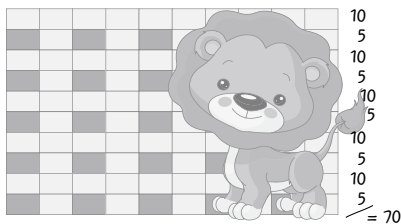> [ ] blue tiles

Correct; **2 marks**

- The use of multiplication and subtraction is efficient, and the method is explained effectively.

> Well what I did was 10 and then I did add 5 becos that is the next row and that is 15 and then I did add 10 again what is the blue row that makes 25 which I did on my fingers and then I did add 5 what is 30 and then I did add 10 and I know that is 40 because it is like 3 + 1 and then I did add 5 and that is 45 and then I did add 10 what is 55 like what I did say before and then I did add on another 5 so now there is 60 and add 10 more what is 70 and 5 more what makes 75 and that is how I know the answer is 75
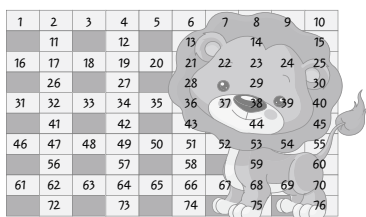>
> [ ] 75 blue tiles

Correct; **2 marks**

- This learner uses repeated addition. They clearly understand the problem but would benefit from discussion on how to show their work more concisely.
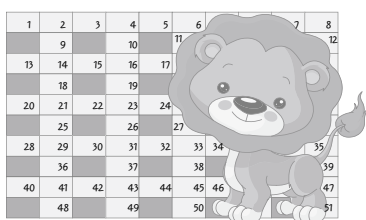

Correct groupings; **1 mark**

- The annotations on the diagram show understanding, but the total is incorrect.

Incorrect; **0 marks**

Common error: This learner works inefficiently, attempting to number each blue tile. However, one number is omitted. As there are no groupings, no marks can be given.

Incorrect; **0 marks**

Common error: Counting only the blue tiles that can be seen is another common error.

Making patterns

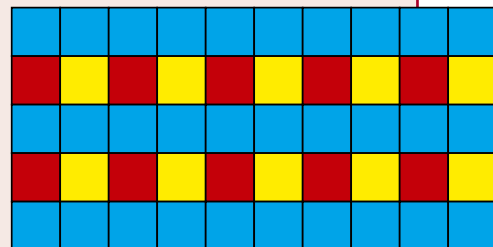# Activity 2 – Making patterns

Outline

This Year 2 activity continues the theme of patterns introduced within **Activity 1 – How many tiles?**

Learners work with the teacher to understand how the number of tiles in a pattern can be found using multiplication. Then they solve and create patterns of their own.
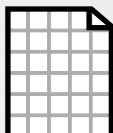
You will need

WB Whiteboard – Wall

R Resource sheet – Our wall
One sheet for each pair/group

Colouring pencils

Squared paper

Activity 2 – Making patterns

Explain

Show **Wall** on the whiteboard and ask learners to describe the pattern. Then ask them how we can show the number of blue tiles, red tiles and yellow tiles by writing multiplications. Support them to understand that because there are 3 lots of 10, the blue tiles can be represented by $3 \times 10 = 30$, then write the multiplication in the boxes. Similarly, there are 2 lots of 5 red tiles, so the red tiles are represented by $2 \times 5 = 10$, and there are 2 lots of 5 yellow tiles, so the yellow tiles are also represented by $2 \times 5 = 10$.

Ask learners to discuss – can they find two different ways to work out the total number of tiles? Again, support them in understanding that we can add the number of blue, red and yellow tiles *(i.e. 30 + 10 + 10 = 50)* or because there are 5 rows of 10 we can use multiplication *(i.e. $5 \times 10 = 50$)*. Tell them that mathematicians always check their answers to make sure that they have not made a mistake!

Now give each pair/group a copy of the resource sheet **Our wall**. Their task is to colour the wall, using a pattern, so that it matches the multiplications. Remind them that someone else should be able to continue the pattern if there were more rows of tiles.

Finally, they use squared paper to create a similar problem for other groups to solve, but this time they choose the number of different colours and the size of the wall.

Question

- What makes a 'pattern'? If you colour in the grid, in any order, would that be a pattern?

- Have you checked you have made a pattern? Would someone else be able to continue it?

- How confident are you at using multiplication?

- Why do we need to learn our times tables?

- Why do we check answers?

- What grid size are you using for your problem? What would be an easy grid size to use? What about a difficult one? What makes it difficult? *(Some learners may be able to use grid sizes that force multiplications using other than the 2-, 5- and 10-times tables.)*
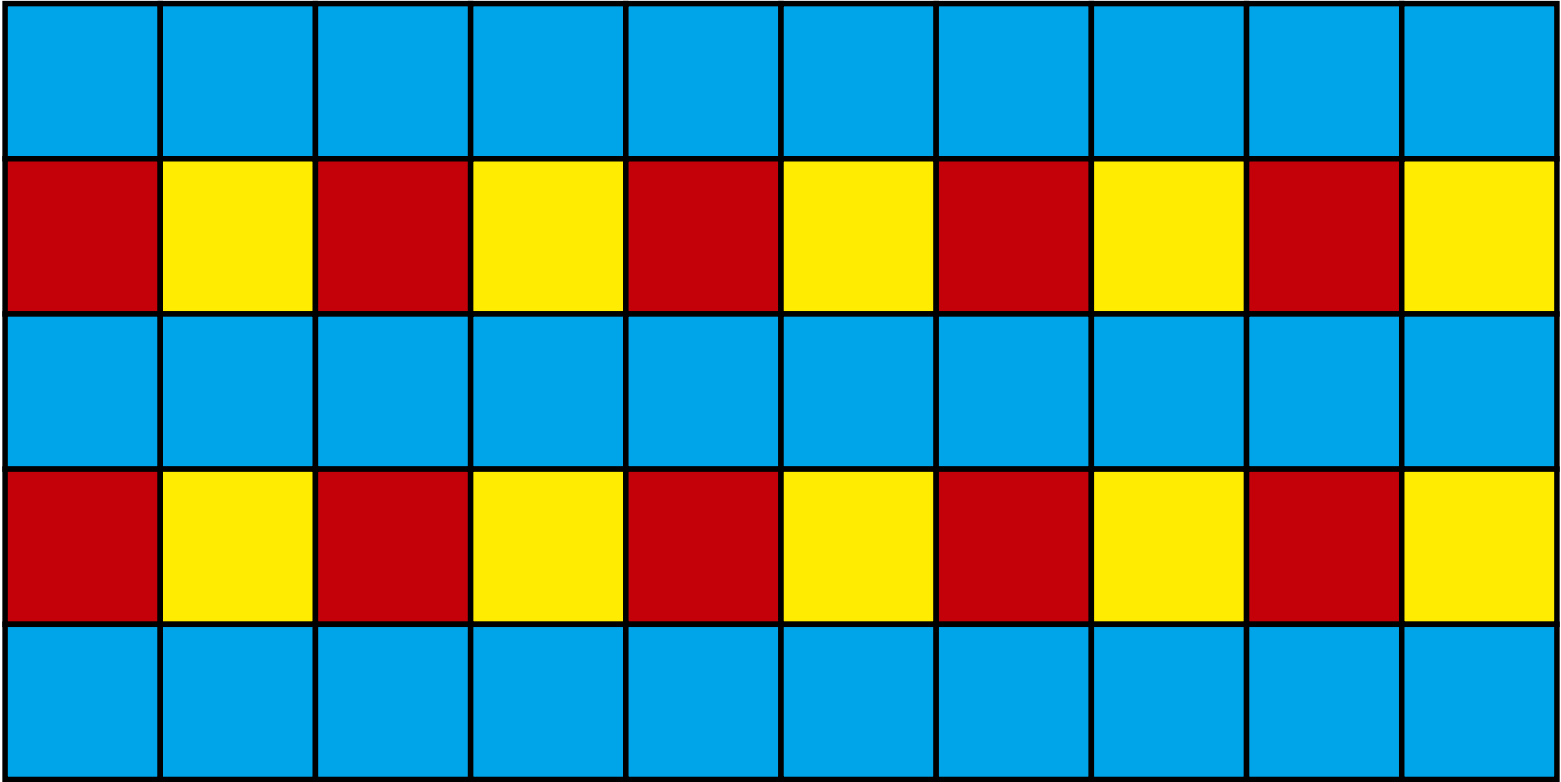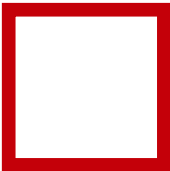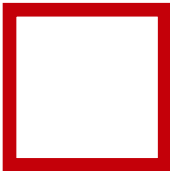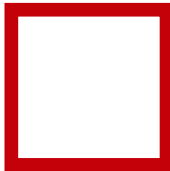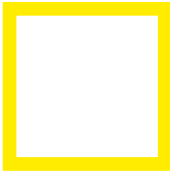
Blue tiles □ × □ = □

Red tiles □ × □ = □

Yellow tiles □ × □ = □

Blue tiles $\boxed{4}$ × $\boxed{5}$ = $\boxed{}$

Red tiles $\boxed{3}$ × $\boxed{10}$ = $\boxed{}$

Yellow tiles $\boxed{2}$ × $\boxed{5}$ = $\boxed{}$

Total $\boxed{}$ + $\boxed{}$ + $\boxed{}$ = $\boxed{}$

Check $\boxed{}$ × $\boxed{}$ = $\boxed{}$