

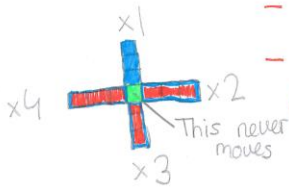
EXAMPLES OF STUDENTS' WORK

MODEL RULES

- Model Type 1

1- 2- 3-

model = m



- Every model has $(m \times 4) + 1$ tiles -

- Model 3 has 13 tiles, this is because 3×4 is 12. $12 + 1 = 13$. In this

case, m, the model number is 3 -

- Examples - Model 1 $\rightarrow (1 \times 4) + 1 = 5$ -

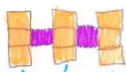
- Model 72 $\rightarrow (72(m) \times 4) + 1 = 289$ -

- Model 473 $\rightarrow (473(m) \times 4) + 1 = 1893$ -

- Model Type 2

1. 2. 3.

model = m



This gives how many columns.

There is 3 in each column, so this gives you how many are in all the columns.

- Every model has $m + ((m+1) \times 3)$ tiles -

- Model 2 has 11 tiles because $2 + ((2+1) \times 3)$

- Examples - Model 5 $\rightarrow 5 + ((5+1) \times 3) = 23$ tiles -

- Model 93 $\rightarrow 93 + ((93+1) \times 3) = 375$ tiles -

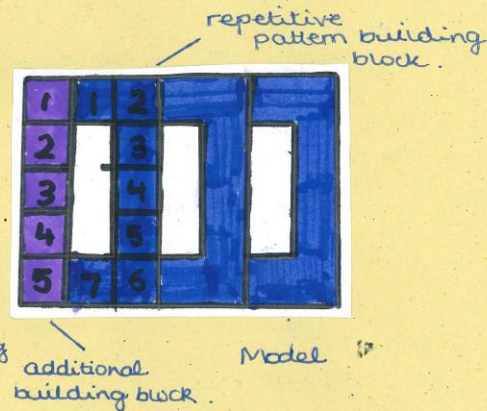
- Model 432 $\rightarrow 432 + ((432+1) \times 3) = 1731$ tiles -

TRAIN TRACK...

Calculating the formula of the pattern:

1. To calculate the formula of the train track, you must start by splitting the pattern into 2 sections: (right) additional building block and the repetitive pattern building block. In the example given the repetitive building block is the C shaped pattern which is repeated constantly at random (the rest of the pattern is not shown).

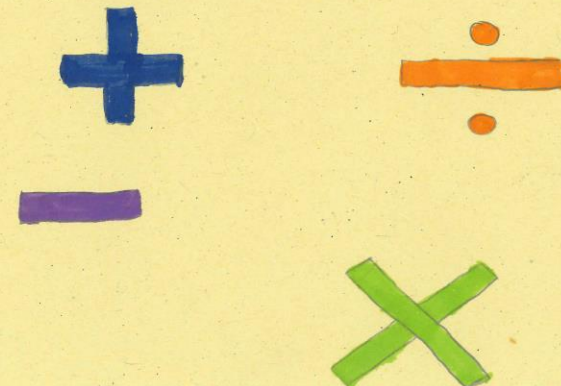
2. In this example we have decided to give the C shaped building block a name: Blues. This pattern contains 7 tiles. Therefore, if the pattern should consist of (model number) m number of tiles, the formula would be: $7 \times M = 7M$ (if $M=3$, then $7M=21$).



3. Given that the model isn't only made by Blues, the starting/ending 5 purple tiles must be added to the starting formula. Therefore, the formula for finding the overall number of tiles in the model is: $7M + 5$.

How and where to create patterns like these:

You can create many more patterns like these just by going online on a website called Expresser. There can be many more ways to make many different patterns just by using some colourful squared tiles.



block

PATTERN

Model 1:



total: 3

Model 2:

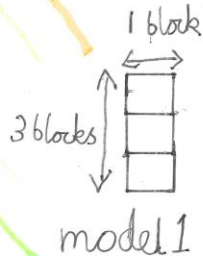


total: 8

Model 3:



total: 15



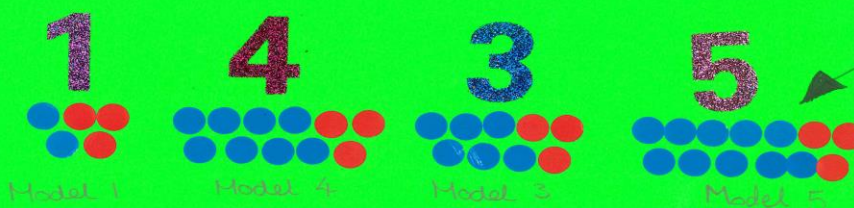
Explanation:

The width of any figure in the pattern is always equivalent to its model number (in this case 1). The height of any figure in the pattern is always the model number + 2.

If you multiply the width by the height of any figure in the pattern, you get the number tiles in the figure.

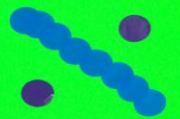
Therefore, the formula is $m \times (m+2)$.

Sequences



● = Model #
● = Added 3

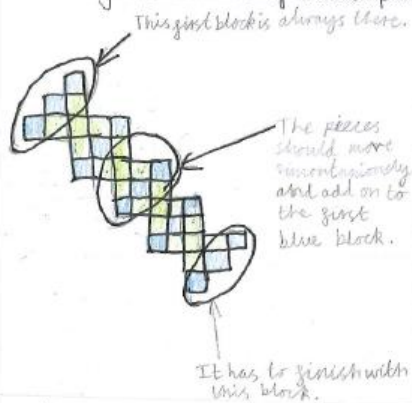
there is always a triangle at the end. is red!



For this sequence we have to find out the model rule.
First we have to find the pattern for the red dots. We have found out that the model number will always have three red dots at the end of each model - a triangular shape. Next we have to find out the blue dot pattern. As you can see the model number has the same number of blue dots on the top row and bottom. So therefore the model rule for this sequence is $(\text{model\#} \times 2) + 3$.

Lines + Crosses

This problem involves green crosses and blue lines; the green crosses consist of 5 green tiles and blue lines are made of 3 blue tiles. However, you only begin with the crosses as a pattern, and you have to work out how to put the blue lines in the correct position without altering the amount of sliders/patterns.



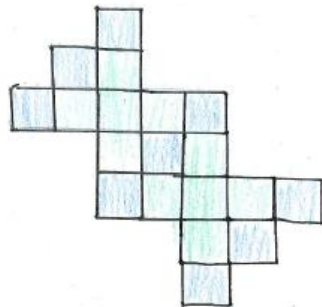
How to do it?

First, make a line of three building block tiles. Now leave them. Make another exactly the same, now click on show properties, make them 2 across and 2 down. Now replace the 4 under 'How many building blocks' for No. of crosses. Then make 'How many tiles' $3 \times \text{No. of crosses}$. Now try and increase and decrease the slider and the lines and crosses move together.

Model Rules

For the Model Rules you must do No. of crosses $\times 8 + 3$ because there are eight tiles in a cross + a line, 5 in a cross and 3 in a line, and 3 for the extra line at the top of the pattern.

$$M \times 8 + 3 = \text{Formula}$$



$$(\text{NO. OF CROSSES} \times 8)$$

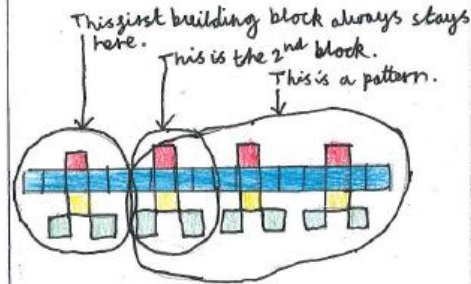
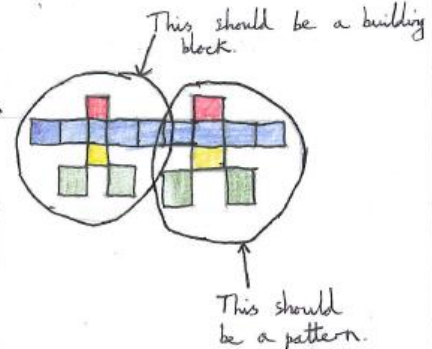
$$+ 3$$

Multicoloured Humans

This problem involves every coloured block in expresser - which are blue, red, yellow and green - to make a human. It's not too easy and not too hard. Furthermore, it is made using 1 red, 5 or 4 blue, 1 yellow and 2 green blocks. Similar to the lines and crosses problem, you can only have 1 slider/pattern.

How to do it?

First of all, you need to make a human as shown in picture one then make this a building block. Now repeat what you did but don't put the furthest to the left blue tile in. Make that a pattern and make sure the left blue block touches the blue block next to it. Unblock the number of patterns, call it something, put that in the 1 red, blue, green and yellow and multiply them by how many tiles there are in one pattern. When you increase the pattern, you will see it works.



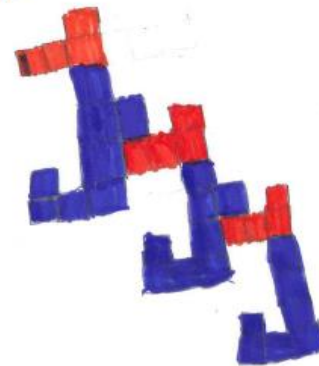
Model Rules

We will be using M to represent the amount of patterns in Multicoloured Humans. To find out how many blue blocks there are you would do $(M \times 4) + 5$ because there are 4 in one pattern and the extra 5 at the beginning that will always be there. It is the same with the others, red would be $(M \times 1) + 1$ or $M + 1$, yellow would be $(M \times 1) + 1$ or $M + 1$ and ~~M~~ green would be $(M \times 2) + 2$. To work out how many blocks there are in total, you should do $((M \times 4) + 5) + ((M \times 1) + 1) + ((M \times 1) + 1) + ((M \times 2) + 2)$ or $M(4+1+1+2) + 2M + 2$



In lines and crosses there was a pattern which went a diagonal line of blue and then a green cross etc. The blue line always had to be at the beginning and at the end of each cross. The bottom line of the cross would have to be the top line of another cross. To make this happen we had to make one separate blue building block at the top and then have a green cross with a blue line at the bottom as another building block. This way there

The formula (with pattern) for the lines and crosses pattern is $8x-3$, x being the number of the pattern. The formula for the blue blocks is $3x+3$. The formula for the green blocks is $5x$. The way you made the pattern on expressor was to make a separate building block for the green and blue blocks. Then you went into go into ~~pop~~ unlock the pattern. To make in the blocks colored go to properties and types in how many blocks you want colored. there would be a blue line



The seahorse pattern formula is $12x$. The formula for the red blocks is $4x$. The formula for the purple blocks is $8x$. The pattern is basically made out of red and purple blocks. one seahorse pattern is made out of red 3 red blocks and 8 purple blocks. In a ratio this is 3 red: 8 purple.