ALGEBRA TILES: GETTING STARTED

Introduction

Algebra tiles consist of 3 different size tiles.
One size of the tile is coloured and the reverse is red. The red sides are the additive inverses for their pieces; we can think of them as representing their negative values.

Constant = 1  = -1 (+  = 0)

Variable  = x  = -x
(It is not possible to arrange the 1 tiles to create the x tile.)

Variable squared  = x^2  = $-x^2$

(These squares have side length x)

Pupils need to understand that <u>pairing</u> the + side and – side of tile results in zero. They need plenty of practise with the tiles to get the idea of this.

Starting Activities: Algebraic Substitution

<u>E.g. 1: Find **3x + 1** if **x = 2**</u>

STEP 1: Model the expression **3x + 1** with the tiles 

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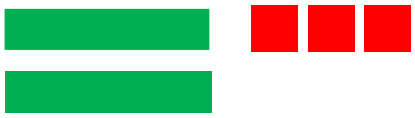
STEP 2: Using the information x=2, substitute each x tile for two 1 tiles .

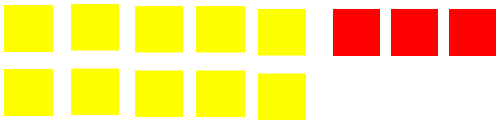
Now it is easy to see that if **x=2** then **3x + 1 =7**

E.g. 2: Find **2x – 3** if **x =5**

STEP 1: Model the expression **2x - 3** with the tiles

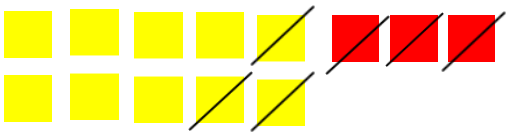


STEP 2: Using the information x=5, substitute each x tile for five 1 tiles .



STEP 3: Each red tile cancels out a yellow tile because they are additive inverses.

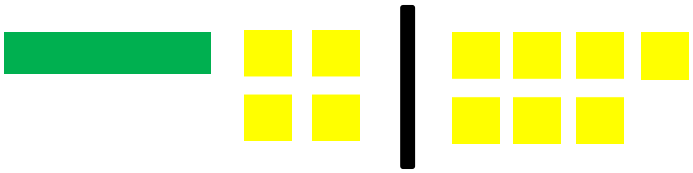
So if **x = 5** then **2x - 3 = 7**



Moving On: Solving Equations

E.g. 1: **x + 4 = 7**

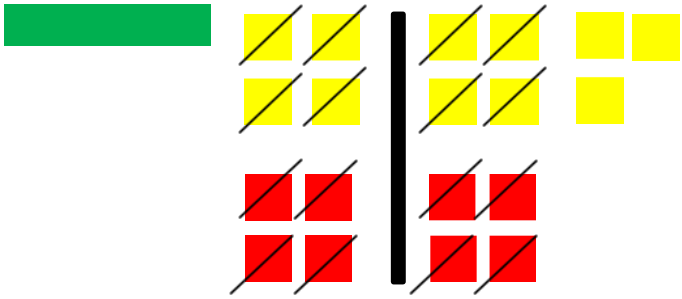
STEP 1: Model the equation using the tiles. You will need a defined space for each side of the equation.



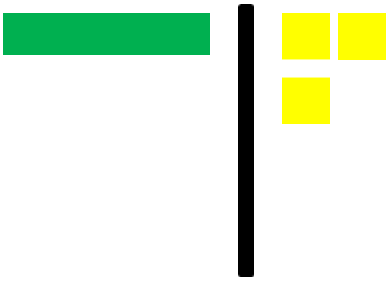
x + 4 = 7

STEP 2: We need to isolate the variable tiles (x) to find their value.

To do this we create additive inverse pairs. Each of the four '+1' tiles from the left can be paired with the four '-1' tiles to create 0 pairs, thus removing them from the calculation. Both sides of the equation maintain equality.



x + 4 - 4 = 7 – 4



so x = 3

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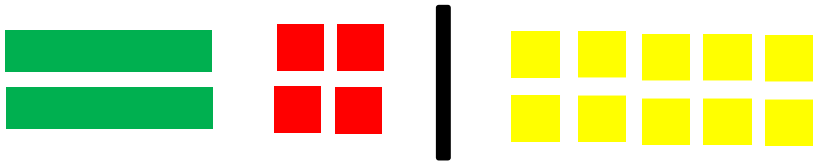
E.g. 2: **2x - 4 = 10**

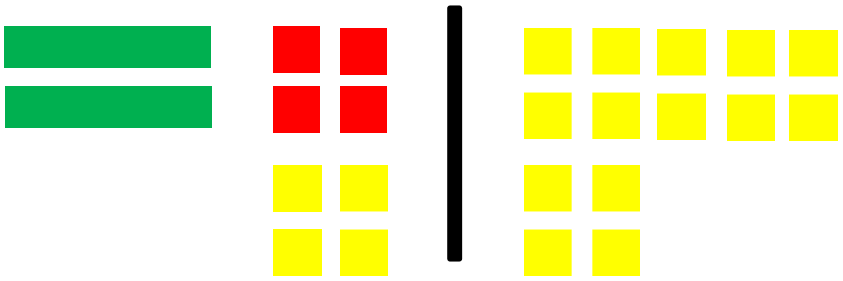
STEP 1: Model the equation using the tiles. You will need a defined space for each side of the equation.



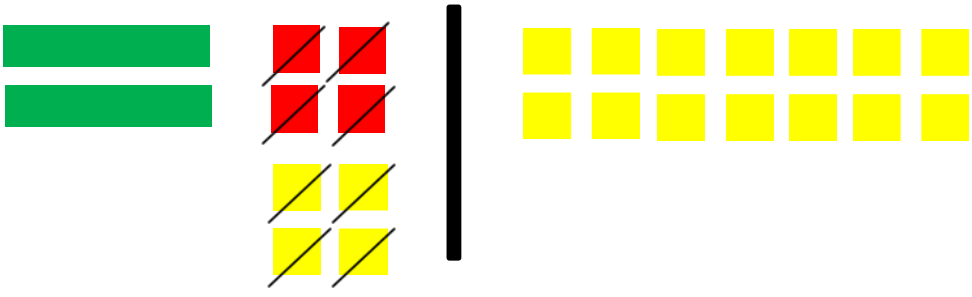
2x - 4 = 10

STEP 2: We need to isolate the variable tiles (x) to find their value.

To do this we create additive inverse pairs. To remove the four '-1' tiles from the left pair them with 4 '+1' tiles, thus removing them from the calculation, then add four '+1' tiles to the right to maintain equality.



2x - 4 + 4 = 10 + 4



So 2x = 14

So x = 7