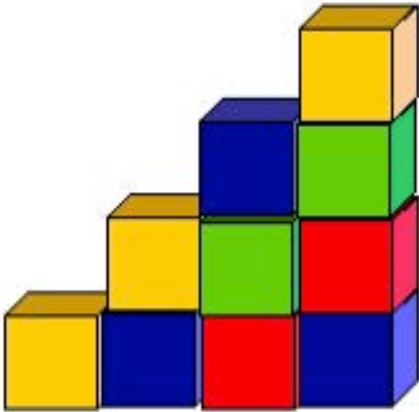


Problem 1: Straight up the stairs

How many blocks are in this 4-step-up staircase?



How many blocks would there be in a 5-step-up staircase?

How many blocks would there be in a 6-step-up staircase?

How many blocks in a 10-step-up staircase?

How many more blocks will an 11-step-up staircase need?

What is the largest up staircase that you can tell us about?

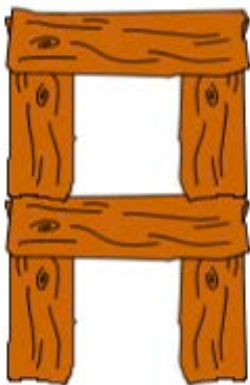
Note: the numbers of blocks in this pattern are the triangular numbers, see Algebra Information.

Problem 2: Climbing ladders

How many pieces of wood have we used in this 1-rung ladder?



How many pieces of wood have we used in this 2-rung ladder?



How many pieces of wood would there be in a 4-rung ladder?

How many pieces of wood would there be in a 6-rung ladder?

What is the largest ladder that you can tell us about?

How many pieces of wood will you need to add to a 7-rung ladder to get an 8-rung ladder?

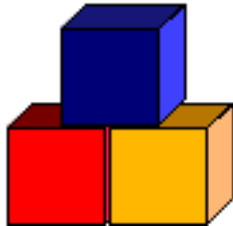
Note: the number of pieces of wood is three times the number of rungs.

Problem 3: Small steps

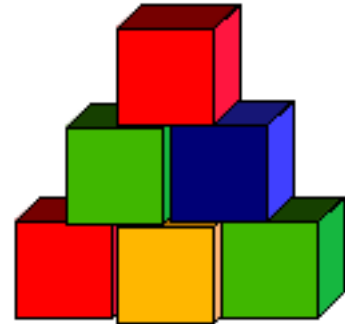
Watch out! You need to take small steps to walk up and down these little stairs.



1-step



2-step



3-step

How many blocks are in the 4-step staircase?

How many blocks are in the 6-step staircase?

What is the largest staircase that you could tell us about?

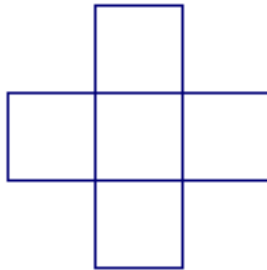
Does this remind you of something you have done before?

Note: the count here is the same as that in Problem 1.

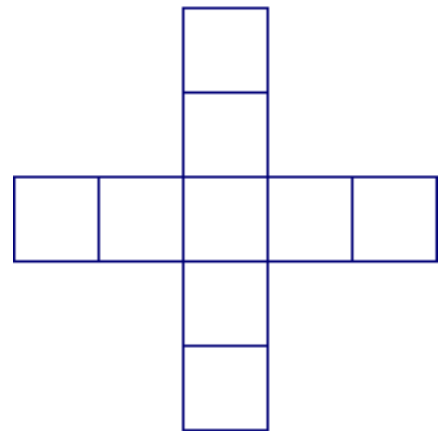
Problem 4: Star patterns



This is a 1-star



This is a 2-star



This is a 3-star

How many blocks are in a 4-star?

How many blocks are in a 5-star?

What do you notice about the stars?

How many blocks do you need to add to a 7-star to make an 8-star?

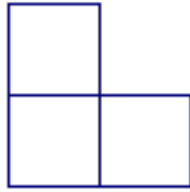
What is the largest star that you could tell us about?

Note: the pattern here is 1, 5, 9, 13, ... At each stage you add on 4 blocks. To make a 100-star you need to have 99 lots of 4 plus one block for the centre.

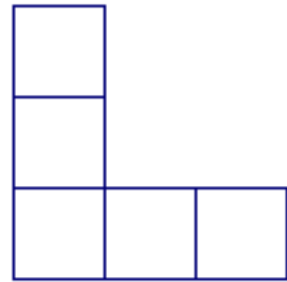
Problem 5: L-shapes



This is a 1-L



This is a 2-L



This is a 3-L

How many blocks are in a 4-L?

How many blocks are in a 5-L?

What do you notice about the pattern in the L's?

What is the largest L that you could tell us about?

Note: to make a 100-L you need $100 + 100 - 1 = 199$ blocks.