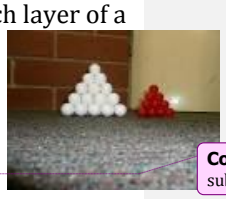
Pyramid Puzzle Report – Hannah B

The problem, Pyramid Puzzle, was about discovering how many spheres were in each layer of the tetrahedron and finding solutions and formulas to determine how many spheres were needed to create a five and ten layer tetrahedron.

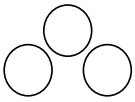
Pyramid Puzzle is a problem using spheres, attempting to make a tetrahedron. The problem asked us to make a four layer tetrahedron, using a 1x4, 4x1, 2x3 and 3x2. After completing this we were instructed to find rules for each layer of a five-layer tetrahedron and a ten-layer tetrahedron. Making a four-layer tetrahedron allowed us to find the number of spheres for each layer.



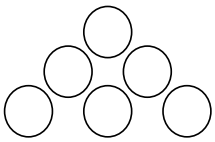
Comment [D1]: There are no subheadings in your report.

Firstly, we made the four-layer tetrahedron. We did this by trying different structures with the 4 pieces. After finding the pattern of each layer (layer 5 = 1+2+3+4+5), we started working out the number of spheres for each layer of a four and five layer tetrahedron.

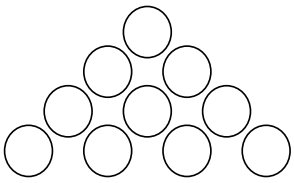
Layer 1 = 1



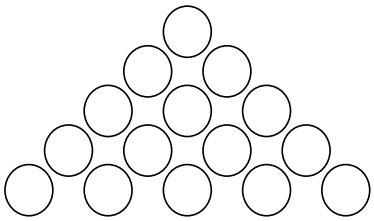
Layer 2 = 1+2



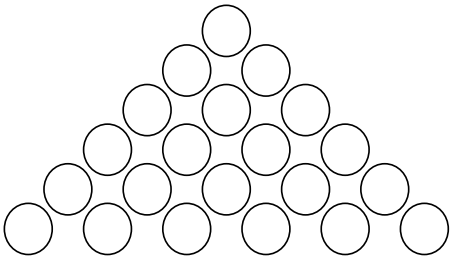
Layer 3 = 1+2+3



Layer 4 = 1+2+3+4

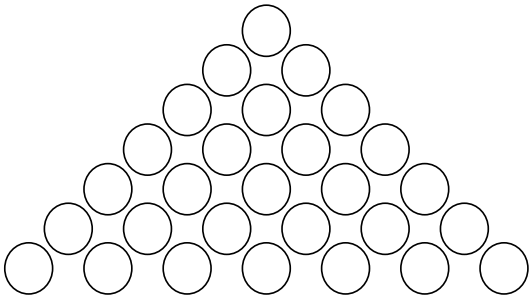


Layer 5 = 1+2+3+4+5

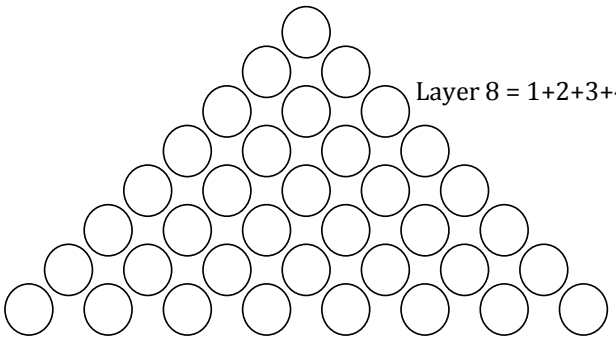


Layer 6 = 1+2+3+4+5+6

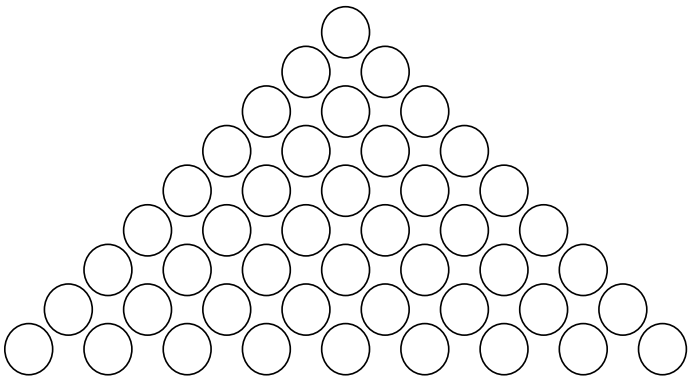
Comment [D2]: Good effort to show the triangles as a sum of integers.



Layer 7 = 1+2+3+4+5+6+7



Layer 8 = 1+2+3+4+5+6+7+8



Layer 9 = 1+2+3+4+5+6+7+8+9

Next, after finding the structure for tetrahedrons, we found out how many spheres were in each layer and found a pattern. Using foam spheres, we made a five-layer tetrahedron in which we discovered it takes 15 spheres to make the fifth layer. This also allowed us to test our rule, making sure it is consistent. Using our same rule, we found out how many spheres we needed for a 10-layer tetrahedron, being 55 spheres.

Eventually, we made the pattern into a rule. Our rule for each layer was **n layer = nx1, 2(n-1), 2(n-2) etc.** This enables us to find each layer quickly, effectively and accurately.

Comment [D3]: This rule is not very clear the way you've explained it. Could be helped by showing a specific example.

Number of Layers	Number Of Spheres in Layer	Number of Spheres in the Pyramid
1	1	1
2	3	4
3	6	10
4	10	20
5	15	35
6	21	56
7	29	85
8	36	121
9	45	166
10	55	221

Comment [D4]: Good table.

After completing this task, we know there is rule that we can use to find out each layer of a triangular pyramid. We started working out each layer by individually adding (layer 5)1+2+3+4+5. After this, we made a formula and proved it to work. There is also a structure to the pieces so you can make any size tetrahedron.
An n layered tetrahedron can be made with n pieces that look like this –

Comment [D5]: You started this like it was a conclusion but then introduced a new idea. Not a logical sequence of ideas.

A good effort, Hannah, on a challenging task. You've incorporated diagrams, pictures and tables fairly well. The writing is good but sometimes it was difficult

to understand what you were trying to explain. Needed to plan each section carefully – subheadings would have helped, as well as thinking about the sequence of your ideas.