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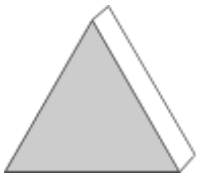
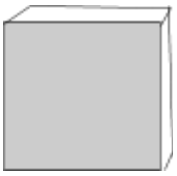
Summary Paper

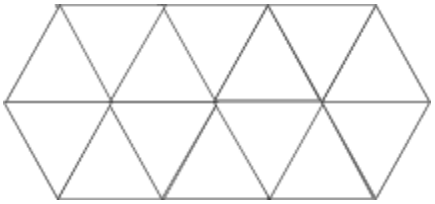
Volume, surface area, tessellation, and structural integrity are essential to test what shapes are the most beneficial for a honeycomb. You need volume to see how much honey the shape can or cannot hold. Surface area to see how small it can be while still being able to hold large amounts of honey. Tessellation ensures that the shapes can interlock with each other so no space is left in between, and of course, structural integrity to make sure that it can be supported and not collapse if there are too many bees.

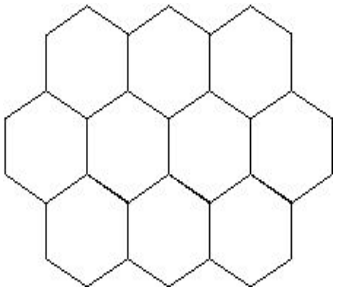
I'm going to be comparing the natural hexagon to a triangle, and a square. All of them will have a perimeter of 300 inches, a height of 9 inches, and a surface area of 2,700. They will be missing the front sides as you can see in these diagrams, the sides filled in with gray will not be there. Therefore all of the surface areas will be based on the sides, not actual shape.

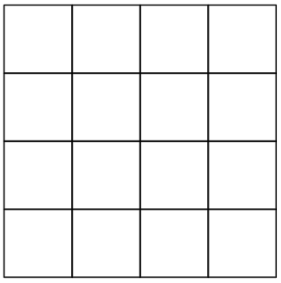




Triangles, hexagons, and squares tessellate really well as you can see in these images, this is helpful because it leaves no space in between each line. We want to maximize the amount of honey we can store and if there are spaces it doesn't work as well. Speaking of maximizing the amount of space used, volume is also an important variable. Volume is essential because it shows how much honey each individual shape can hold. With the perimeter, height, and surface area this is how much volume roughly each shape can hold Hexagon: 58,456.7568 Square: 50,625 Triangle: 38,971.125







Structural integrity, however, is another story. On February 11th we did a test to see what shapes could support the most textbooks. The hexagon could support 2 textbooks, a square could only support 1 and a triangle could support 2. However, they shapes were not tessellating, they were just standing individually, only with support from students to make sure they weren't leaning.

So, when they shapes, like triangles, were tessellating they could support much more, as many as 20 textbooks.

Personally, I believe that the hexagon truly is one of the most efficient shapes, it shows itself in nature constantly, itcan be supportive as long as the hexagons are interlocking it can hold the most amount of volume passed on the surface area, perimeter, and height I chose, and it tessellates seamlessly. During this short, et intriguing unit I