

Toothpick Challenge

Introduction

STEM Challenges can a great way to incorporate learning ideas in your own home. One classic favourite for Science teachers is the marshmallow and toothpick challenge. Engineers start with a challenge: How to solve a problem and how to improve on something that already exists. Engineers are very important in the construction of buildings. They use maths and science to come up with solutions to problems that might arise with the construction of a building. They often need to overcome problems with new solutions that have never been done before, to help realise the dreams of the architect and client. They also need to be able to think creatively.

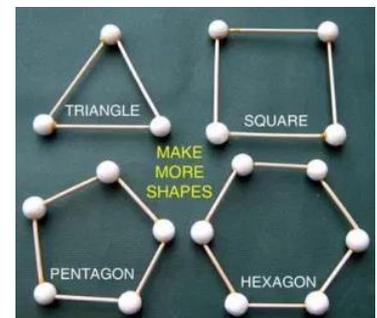
What you will need:

- Toothpicks
- Marshmallows

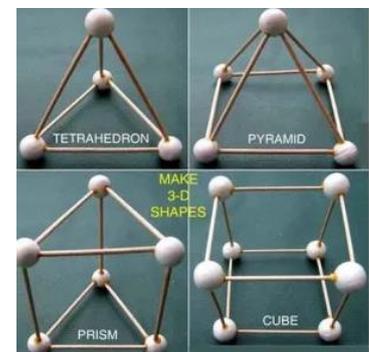
To start with:

Start with what you know...

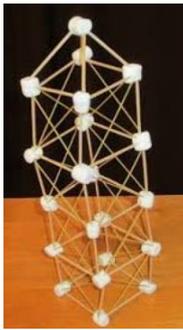
- What shapes can you make with your marshmallows and toothpicks?
 - Which of these shapes are strongest? (Wobble them to find out!)
 - Think of a plan, and begin building!
1. Build one dimensional shapes. Shapes that works well included: triangle, square, rhombus, rectangle, trapezoid, parallelogram, pentagon, hexagon.



2. Build three dimensional shapes. Building pyramids, cubes, prisms, tetrahedrons, and rectangles (hyperrectangle). These small structures will give you a great opportunity to explore methods of creating support. You might see that your shape won't stand up without connecting enough marshmallows and toothpicks.

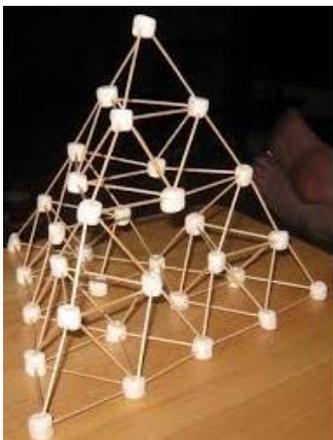
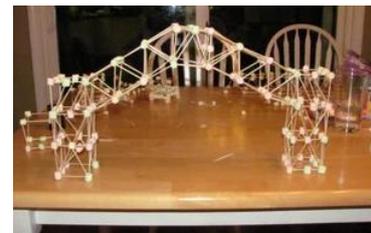


3. Build a house. You can start with simple houses at the beginning, but and then experiment with adding on and growing your own designs houses (and perhaps tree houses!).



4. Build a tall tower. Using our shapes in previous tasks, you need to consider stability in a structure. Can you build a tower using different three dimensional shapes? Remember the strength found in a triangle. A prism shape works really well for creating

5. Build a bridge. Once you tackle towers, bridges are a natural transition. This is a good small team exercise a triangle. A prism shape works really well for creating taller towers.



6. Build a pyramid. Just like the bridges, this is a project best suited for the entire family. Challenge yourselves with limited marshmallows and toothpicks, or limited by time