Engineering and Design

What do engineers do?

- Engineers _____, develop, and manufacture _____, structures, processes and systems that impact society and make humans more _____.
- Designs can be _____ or complex:

Engineering Design

- _____ is the process of devising products, processes and systems that address a need, capitalize on an _____, or solve a specific _____.

Engineers have choices

- When engineers are designing something there is _____ one perfect design. There are a variety of different designs that may all work well.
- New technologies have consequences that may _____ some risks and _____ others.

Engineers have trade-offs

- Engineers have trade-offs in using manufactured products in terms of _____, performance, durability and _____.

Engineers Fail

- Failure is _____ in engineering because it allows them to _____ from their mistakes and create better designs.

Engineering Earthquake-proof Buildings

Because earthquakes can cause walls to crack, foundations to move and even entire buildings to crumple, engineers incorporate into their structural designs techniques that withstand damage from earthquake forces. Earthquake-proof buildings are intended to bend and sway with the motion of an earthquake, or are isolated from the movement by sliders. Engineers come up with an idea, test it, and then re-engineer the structure based on its performance.

Your Challenge

- Design a 3 story building with marshmallows and toothpicks that is capable of withstanding a simulated earthquake.
- Just like in engineering your will have:
    - Limited materials
    - Limited time
    - Trial and error
    - Multiple ways to solve your problem

Before you begin building think about your design a little bit:

What properties do you materials have that would make them useful?

What weaknesses do your materials have that may cause your building to fail?

Explain (in detail) what your design will look like including what features you added to improve the stability of the structure.