

BEAM S11 Lesson Plan: Marshmallow Tower

Sarah, Vanessa, Melissa

Teaching Plan

- Teach lesson: building techniques, stable shapes, etc. (20 minutes)
- Have kids break into groups of 3-4 and have each kid fill out a design worksheet with their idea of how to build the tower (15 minutes)
- Kids share with their groups and implement a design (35 minutes)
- Measure each group's tower to see which group built the highest tower. Discuss successful strategies. Closing discussion. (20 minutes)

Mentors Scientific Background

- Basic physics: forces applied to an object (or a building) with distribute themselves. If the gravity pulling down on the roof of a building is balanced by the normal forces, tension, etc. of the supporting structure, the roof will be stable.
- Certain shapes, like triangles, are stable because of the way forces distribute themselves.

Introduction for the Mentees

- Questions to get the discussion started:
 - How does the Roof not fall on our head?
 - What would life be like if we didn't have buildings?
 - What would life be like if we didn't have safe buildings that were properly built?
 - What are buildings usually made out of? Houses, skyscrapers? What is the difference in material and how do you think that plays in an impact in how a building functions?
- What is the main force working against a building standing up? Gravity, a vertical force.
- Forces push or pull
 - Vertical forces- mainly gravity
 - Lateral forces- could come from wind, earthquakes, etc.
- What kind of shapes can you use in your buildings to distribute these forces?
 - Circles, squares, triangles, etc.
 - A triangle is a very stable shape because the forces distribute themselves- a normal force down on the triangle balances with tension in base of triangle.
- Materials that you use are very important too—a mud brick building vs. a steel framed building.
 - We'll be working with marshmallows and pasta sticks so you mainly have the shape of the structure to contend with.

Modules/Demos, or Project

- Design worksheet
- Building activity/challenge

- Closing discussion

Closing Activity and Discussion

- What worked? What didn't work? How could you improve the stability and height of your structure?
- Instead of having another worksheet, the mentors can take notes on the kids' responses during the discussion to gauge how effective the lesson was.

Materials

- Pasta sticks
- Marshmallows

Name:

School:

Design Worksheet

What shapes can you use in your design? Draw them:

How can you combine these shapes into a structure? Draw your design: