

Engineering Family Guide



Create at Home: Edible Destruction

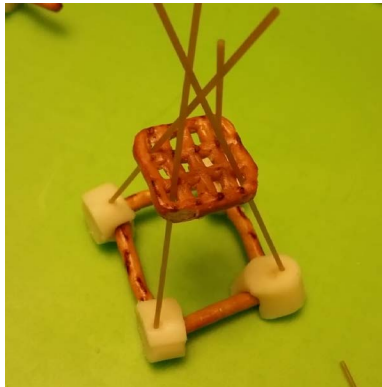
Create a simple structure (6 inches or taller) that stays standing in an “earthquake.”

You'll need:

- A paper plate and tape
- Graham crackers
- Straight pretzel sticks or pieces of uncooked spaghetti
- A piece of string cheese, cut into pieces
- Mini marshmallows or gumdrops or Tootsie Rolls
- Ruler
- Missing an item? Have other ideas? Use your engineering creativity to come up with other options!

What to do:

1. Think about how you would like to design your structure. Does anyone in your family have ideas that could help you? Here are a few kid-tested designs:



What to do (continued):

2. Create a “shake table” using cardboard, rubber bands, and balls.
 - Carefully wrap rubber bands around two pieces of cardboard.
 - Put tennis balls in between the pieces of cardboard -- one ball in each corner.
 - Ask an adult to help you measure how fast your shake table moves using an app on a smart phone or tablet (see the other side of this sheet for details).
 - Test it out! With one hand, hold the bottom piece of cardboard. With your other hand, tug on one corner and let go!
3. On a paper plate, use snack foods to build your structure at least 6 inches tall.
4. To test your structure in an “earthquake,” tape your paper plate to the shake table – then shake it up!
5. Make one change to your design and try again to make it even better (and tastier).
6. When you are finished trying different designs, take a picture of your creation – then dig in!

Hint from an engineer:

Use triangles and “x”-shaped supports. These shapes are sturdier in an earthquake than rectangles or squares.

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You Are the Most Important Role Model Your Children Have!

- Nurture your child's curiosity.
- Grow your child's ability to persist and maintain a "can do" attitude.
- Explore engineering with your child to help them build life skills and to seek out new learning opportunities... and eventually, diverse career possibilities.
- Develop your child's critical thinking and problem-solving skills by doing hands-on activities or household improvement projects together – and iterating on your solutions to make them even better!

What You Can Do:

Explore Technology Together

Engineering is essential to our health, happiness, and safety. From sophisticated software to drones to robots, technology helps engineers do their work every day.

Many free apps are available that transform your smart phone or tablet into a tool for exploration. Try an app such as Physics Toolbox Linear Accelerometer, by Vieyra Software, with the hands-on activity on the reverse side of this sheet. The app plots the movement of the device as acceleration over time and can be used to measure the movement of the "shake table." Try to make the shake table move 5 meters per second (or "5 m/s²") or faster.

Download the free app at:

<https://www.vieyrasoftware.net/physics-toolbox-accelerometer>

This accelerometer sensor app (pictured on the right) measures and displays a graph of G-Force vs. Time (s) and Acceleration (m/s/s) vs. Time (s) in x, y, and/or z dimensions, as well as total magnitude.



Watch Video Clips of Engineering in Action

Dream Big: Engineering Our World

<http://www.dreambigfilm.com>

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This material is based upon work supported by the National Science Foundation under Grant No. DRL-1657593. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.