Building a Shake-proof Home

Earthquakes are caused by rocks breaking underground.

When rocks break suddenly, seismic waves are generated. These travel through through the Earth and cause the ground to shake. Most earthquakes occur at tectonic plate boundaries, and they are a dangerous natural hazard. Large populations of people live along these boundaries, and so houses and large buildings must be built to withstand the shaking.

The challenge in this activity is to create and build your own shake-proof building, but before this can be attempted, you will need to create a shaking table to test your construction!

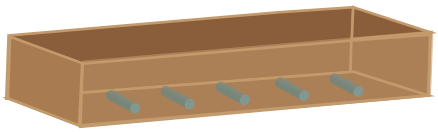
How to create a shaking test table

Step 1: Take a cardboard box (a cereal box works well for this) and cut off the front panel. Save the front panel of the box - you will need this later. Use sticky tape to secure the edges.

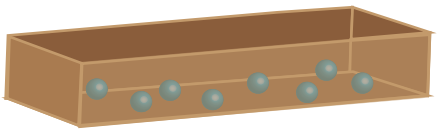
Equipment:

Pens/Pencils/Marbles/Tennis balls
Cardboard box
Scissors

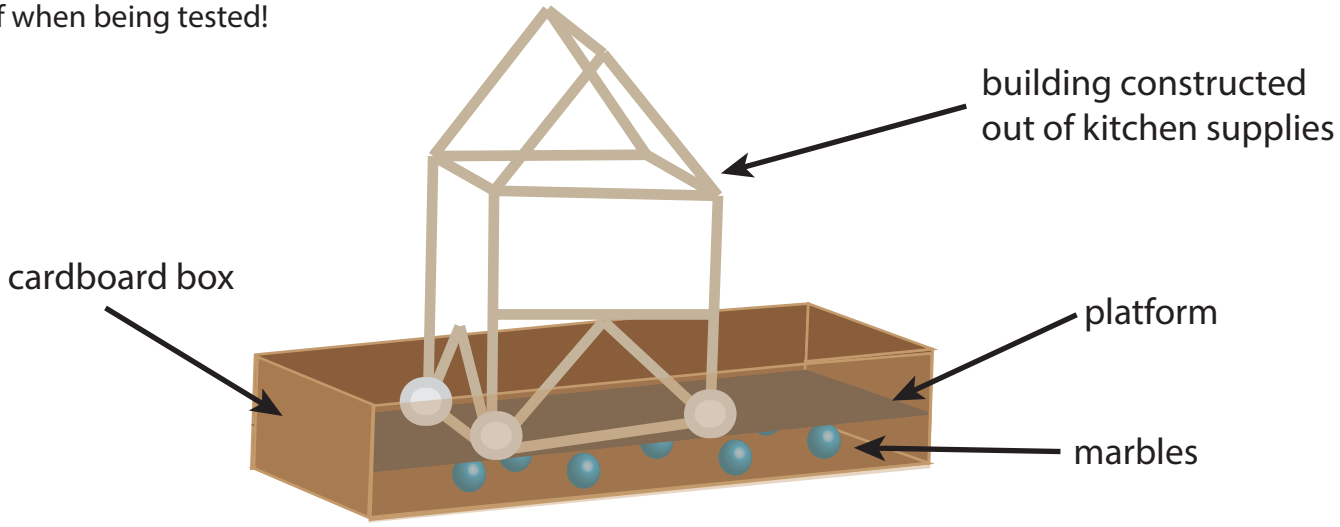
Step 2: Now add either marbles, pens/pencils or small bouncy balls to create an unstable layer in the bottom of the box. You don't need to add too many, just enough to create an unstable base.



or...



Step 3: Cut the front panel in half, such that it fits easily ontop of the marbles. This will create a platform to test your building (it will be very wobbly!). You will need to construct your building on top of the front panel (that you cut away from the box earlier). Make sure you secure it to the cardboard platform or it will immediately fall off when being tested!



Step 4: When you're ready to test, place your platform on top of the unstable base (pens, marbles, tennis balls etc). Then gently shake the box forward and back and side to side to put your building to the shake test.

Design and build your shake-proof home

Buildings that are prone to earthquakes are designed to protect them from collapse.

Engineers will determine the seismic risk for the building and will then need to consider this in the building design. In general, asymmetric or T shaped buildings are avoided as these can be prone to twisting! A very strong shape is the triangle. Triangular building shapesas well as the use of crossbeams and beams can be used to create very stable buildings.

Now it's your turn to create your own building. Gather your building materials. Think about the walls, will this be made out of lego, spaghetti, sweets, strips of cardboard, construction sticks... ? Then you will need something to connect and stick your materials together such as marshmallows, Blu Tac, soft gummy/foam sweets or many more.

Take inspiration from your gathered materials and design your building below. Use the internet to research famous buildings that are prone to earthquakes and see if their design helps inspire yours.

Building design

Once you are happy with your design, it's time to create your building. Make sure not to shake it too much when it is being tested (you don't want flying spaghetti!).

? Did your building survive? If so, try to make it taller! If not, what can you add to make it more stable?