

# DIY Earthquake Table

**STEM Lesson:** We will be designing our own Shake Table and creating a structure that can withstand an earthquake using recyclable materials! This earthquake table is modeled after the Outdoor Shake Table used by Natural Hazards Engineers at the University of California, San Diego. Through this activity, we will go through the same Engineering Design Process that Natural Hazards Engineers use when conducting these same experiments to develop infrastructure that can survive earthquakes.



## Materials:

EARTHQUAKE TABLE	TEST STRUCTURE
2 pieces of sturdy cardboard 2 thick rubber bands 2 tennis balls Masking tape 1 ruler	Recyclable Materials: <ul style="list-style-type: none"><li>● Plastic water bottles</li><li>● Food packaging (cereal boxes, plastic containers, etc.)</li><li>● Paper towel/toilet paper rolls</li><li>● Cardboard</li></ul> Scissors Glue Masking Tape Paper Pencils or Markers

## Building the Shake Table

- 1) Add rubber bands around both pieces of cardboard. Space them about 4 inches apart
- 2) Slide tennis balls in between both pieces of cardboard, and position them underneath the each rubber band
- 3) Tape the ruler to the top side of the cardboard. This will be used as the handle to shake the earthquake table



## The Engineering Design Process

Follow these steps as you create your structure to test on the earthquake table:

**ASK:** Why are you building this structure? What does it need to do? What kind of structure is it?

**DESIGN:** On a piece of paper, design your structure before you build it. What materials do you have? What do you think it will look like?

**CREATE:** After you design your structure you can begin constructing it from the available recyclable materials!

**TEST:** Once your structure is finished, you can test it on the earthquake table. Gently place it on the middle of the table and shake it using the handle. Start shaking slowly at first and then shake it faster and faster to see if your structure survives!

**IMPROVE:** Did your structure withstand the earthquake?

If it did...	If it did NOT...
Why do you think it survived? Where is it strongest? Can it be improved in any way?	What happened? Where did it fall apart or collapse? How can it be improved? Can you use any of the available materials to improve it?

See if you can improve your structure based on whether it was able to withstand the earthquake simulation. Once you identify what improvements can be made, you are starting a brand new sequence in the Engineering Design Process! You can repeat this process as many times as you like.

### STEM Careers:

- 1) **Structural Engineers** - Design, plan, and oversee the construction of new buildings and bridges or design improvements to existing structures
- 2) **Earthquake Engineers** - Design, analyze, and test how buildings and bridges react to earthquakes. They also plan new design methods or structures that can better withstand earthquakes

### Resources:

<https://pbskids.org/designsquad/build/seismic-shake-up/Earthquake Shake Test at UCSD>