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Engineering for Earthquakes Experiment

**QUESTION**

How does the rigidity of building materials affect the ability of a building to withstand an earthquake?

**HYPOTHESIS**

Read the hypotheses below. Draw a check mark beside the one that you feel is most likely. This will be your hypothesis for the following experiment.

* The ability of a building to withstand an earthquake does not depend on the rigidity of its building materials.
* Buildings constructed from rigid materials are more likely to withstand an earthquake than buildings constructed from flexible materials.
* Buildings constructed from flexible materials are more likely to withstand an earthquake than buildings constructed from rigid materials.

**MATERIALS**

* Straws
* Wooden blocks
* Masking tape
* Shoe box lid
* Marbles
* Two pieces of cardboard cut to the same size
* Very heavy book
* Modelling clay
* Large pieces of scrap paper

**PROCEDURE**

As a team, you will work together to design two earthquake-resistant buildings. Both buildings must be the same size and shape; however, they will be made out of different materials. Each building must be built on its own separate cardboard base.

Building #1 Made from wooden blocks; held together with masking tape

Building #2 Made from straws and modeling clay; the bottom of the building can be attached to the base with tape (this is the only place where tape can be used)

Once you have finished construction, it is time to test them in a simulated earthquake. It is up to your team to decide together which test you would prefer.

Test #1 Place building #1 on a “shake table” (this is made by filling a shoe box lid with marbles). Shake the lid from side to side and watch how the building responds. Record your observations in the space provided on the next page. Repeat for building #2.

Test #2 Your building will absorb shock waves from a large impact. First, place building #1 onto a piece of large paper and trace around the cardboard base. Next, drop a very heavy book next to the building (be careful that all members of your group are out of the way). Trace around the base of the building again and use a ruler to measure how far your building moved. Record your observations in the space provided on the next page.

Our team chose test # \_\_\_\_\_\_\_

**OBSERVATIONS**

Building #1

Building #2

**DATA ANALYSIS**

1. A) What type of building materials did the wooden blocks represent? What type of building materials did the straws represent?

B) Describe the ways in which the two buildings reacted during the “earthquakes”. Were their reactions similar or different?

1. Would you consider this experiment a fair test? Why or why not?
2. If you had a chance to redesign your buildings again, what would you do differently?

**CONCLUSION**

Look back at your hypothesis. After conducting this experiment, what conclusions can you make about the how the rigidity of building materials affects a building’s ability to withstand an earthquake?