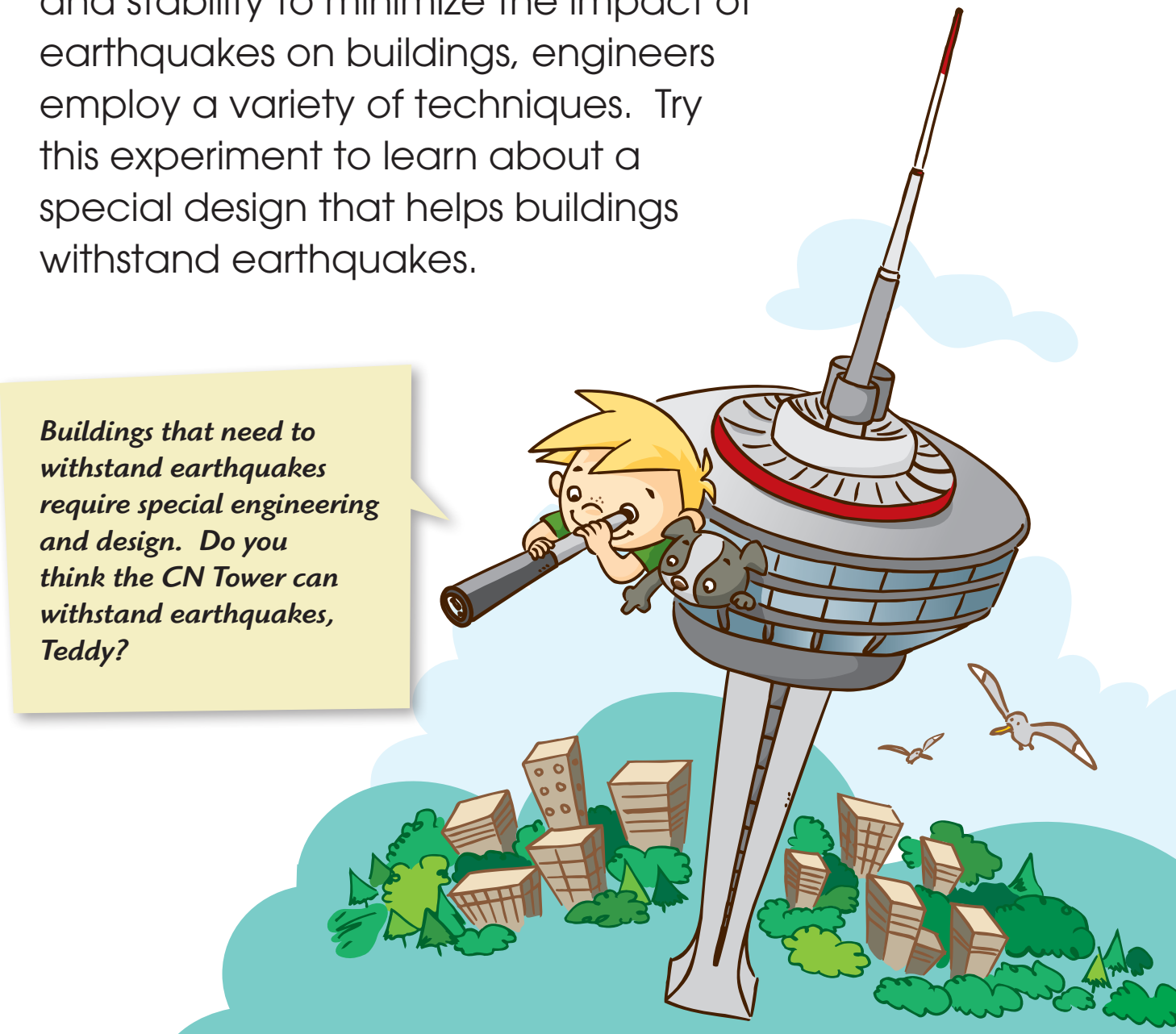
EXPLORATION 2

Earthquake-proof Buildings

Learn about how a heavy weight increases the stability of buildings.

Earthquakes can cause devastation of all kinds – even loss of life. In North American west coast locations, such as British Columbia and California, buildings have to be thoughtfully and strategically built as they are threatened by earthquakes. To ensure strength and stability to minimize the impact of earthquakes on buildings, engineers employ a variety of techniques. Try this experiment to learn about a special design that helps buildings withstand earthquakes.



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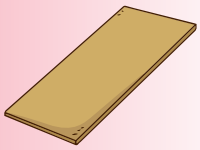
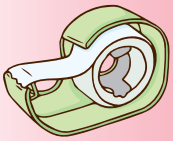
Try this experiment to learn about one of the structural designs used to help buildings withstand earthquakes.

Materials:

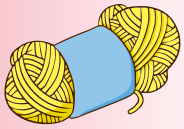

toothpicks

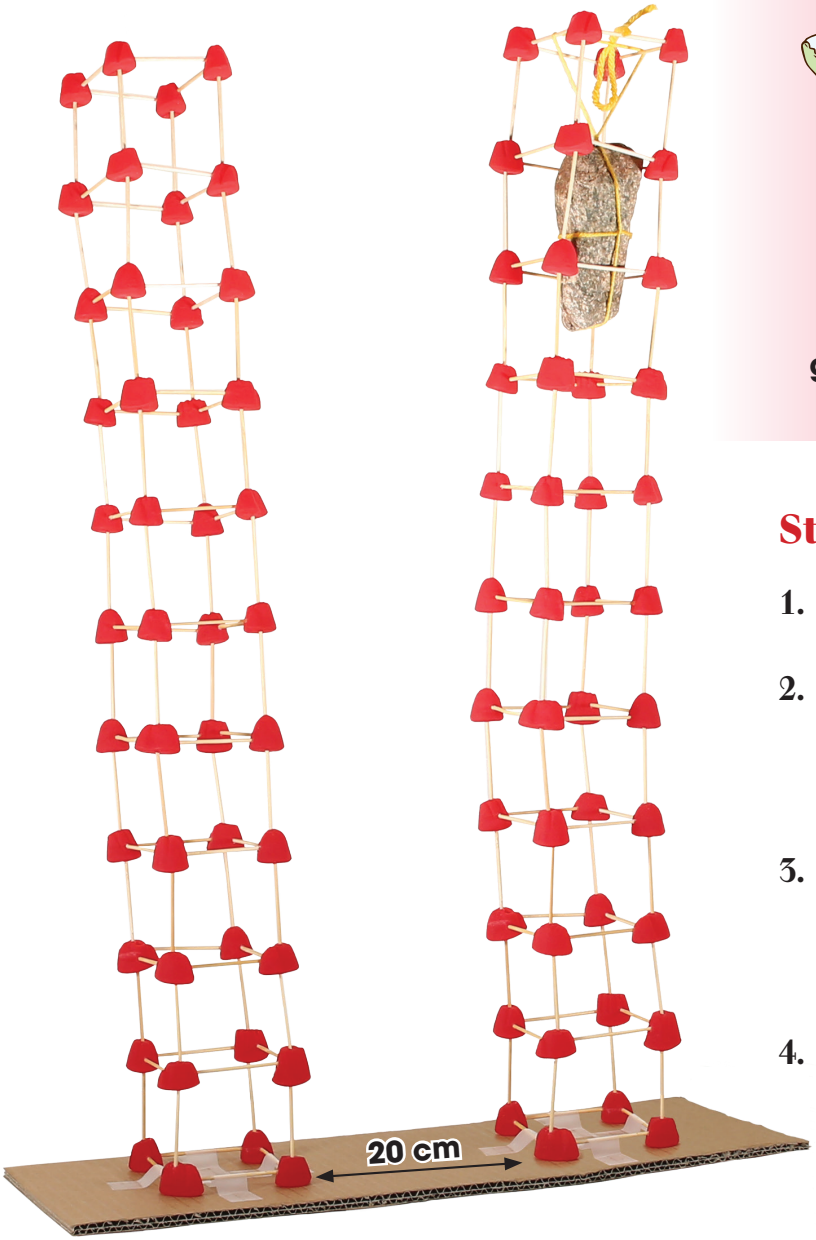

cardboard


tape


a stone


gumdrops


string



Steps:

1. Cut out a big piece of cardboard.
2. Build two identical 10-storey towers with gumdrops and toothpicks.
3. Place the towers 20 cm apart on the cardboard and tape their bases down to it.
4. Tie the string to make a cross at the top of one of the towers. Then hang the stone down from the centre of the cross.

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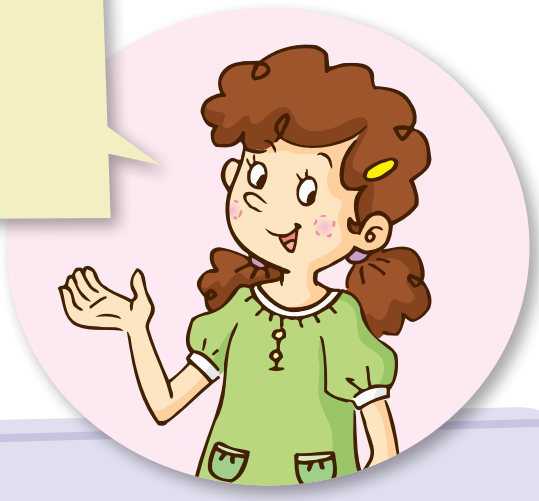
Now, slide the cardboard left and right slowly to simulate an earthquake. Intensify the movement gradually and observe the stability of the two towers.



Explanation:

In this experiment, you should have noticed that the tower with the stone was more stable and could withstand stronger movements before it collapsed. The stone tied inside the tower is what engineers call a tuned mass damper.

A tuned mass damper is a large heavy weight that is centred and hung at the top of a building. It can effectively stabilize motion and reduce the swaying of the building, making the structure more stable during an earthquake.