Enigneering:

**You're Grounded** **Primary Audience: 3rd-6th Grade**

**Description:** See the importance of structure in a tall skyscraper as the forces act against it

**Keywords:**

**Concepts:**

- The base of a structure should be heavier than the top. This creates a center of mass lower to the ground and resists the building from swaying from side to side.

**Materials:**

- 6 plastic cups (10-12 oz.)
- Tape (masking or duct)
- Magazines
- Pennies

**Instructions:**

1. Use 2-3 pieces of tape to connect both the cups together, then the four cups together as shown.
2. Place the two structures about 6" apart on a flat surface
3. Stand about two feet away and use the magazine to fan both buildings
4. Continue fanning until one of them falls
5. Stand them up again and see which one falls over first most of the time.
6. Untape the bottom cup from the 4-cup structure and put about 20 pennies in the bottom. Tape the cup back together and repeat step 3.
7. Note any changes in the structure's ability to stay up

**Possible Interactive Questions:**

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**What's Going On?**

If a tall building sat on the ground and was hit by a strong wind, it wouldn't stand a chance. Builders of skyscrapers have to take into account the force of the wind. They anchor the building into a deep foundation in the earth. The earth itself becomes the base of the skyscraper. The more weight on the base, the safer and more secure the building will be at the top.

**Further Exploration:**

1. What would happen if you added pennies to both layers of cups? What if you

made a six- or eight-cup tower? What would happen if a hair dryer was blowing on the cups, simulating a very strong, consistent wind, like a hurricane? If you shook the table to simulate and earthquake, which building stands up longest?

**ACKNOWLEDGMENTS:**

**http://www.chemistry.org/portal/a/c/s/1/wondernetdisplay.html?DOC=wondernet\activities\structures\reach.html**

**Relevant Ohio Science Content Standards:**

Physical Sciences 3-5 C
Science and Technology K-2 A,B;