



Curiosity Guide #401

Center of Gravity

Accompanies Curious Crew, Season 4, Episode 1 (#401)

Anti-Gravity Tower

Investigation #7

Description

Challenge a friend to defy gravity!

Materials

- 15 to 20 wooden pine blocks, cut to 1 inch by 4 inches by 9 inches
- A friend

Procedure

1. Stack the blocks flat on each other to make a tall tower.
2. Challenge a friend to slide the top blocks so that the blocks hang off the tower as far as possible without toppling over.
3. If the tower topples, try again.
4. How far can the blocks hang off?
5. Do you notice any patterns for positioning the blocks to keep the tower stable?

My Results

Explanation

The trick here is to stack all the blocks neatly. Then start at the top of the tower. You may notice that the **top block** can slide **nearly half-way** off the tower and remain balanced. The block below acts like a fulcrum. As long as the center of gravity on the top block is still supported, the top block can balance.

Now move the second block. You cannot slide this block off as far because the second block still has the hanging block above it. In this case, the **second block** can move **about a quarter of the way** off the tower and remain balanced. The third block moves the top three blocks, so the **third block** can move **about one-sixth of the way** off the tower. The **fourth block** moves four blocks in all and can be extended **about one-eighth of the way** off the tower.

The pattern continues so that **each lower block moves one-half times the total number of blocks**. The fifth block would be at one-tenth the total number of blocks, the sixth block would be at one-twelfth the total number, and so on. If the center of gravity of each block is still supported on the tower, each block will remain balanced.

Extend the activity: You can also try this challenge with a series of textbooks, same-sized dictionaries, notecards, playing cards, or flat rulers. Can you get the same results with different objects?

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