HOUSE OF CARDS

Your Task: Make a Two-Story House Out of Cards

Get inspired!

Have you ever tried to build a house of cards? If so, you may have realized that it takes a lot of patience and hard work to keep the cards balanced. Making a house of cards requires a lot of engineering to keep the cards balanced.

As you look at the images above, consider the following questions:

- What house of cards points are "weaker" (maybe wobbly) and stronger/sturdier?
- What similarities can you find in the way the house of cards are designed?
- Which designs do you like?

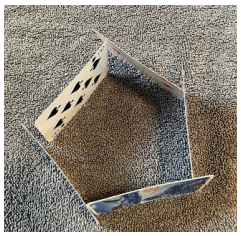
For inspiration (and with adult permission), learn about Bryan Berg who has previously held the Guinness Book of World Records for the tallest tower made of playing cards.

Quick Science Intro: What is balance?

A force is a push or a pull. For any building, there are different internal and external forces that affect its structure; cardstackers (and architects) must keep this in mind when designing. When designing your house of cards, you must keep in mind several forces: the force of gravity, the force of cards pushing against one another, and friction. When forces are balanced, they cancel each other out. To be successful with your house of cards, you need the various forces acting on the cards to be balanced.

Background Research:

Getting to know your materials. If you've never built a house of cards before, that's ok! Try to recreate these shapes first to get the hang of how you can arrange the cards. For additional suggestions, you can also refer to Instructables.com for directions on building a house of cards.

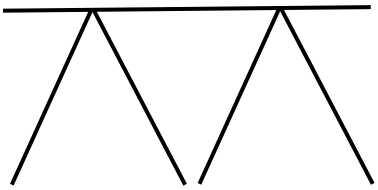


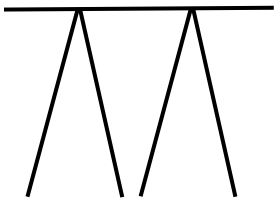
Context Matters

Which do you think would be an easier surface to use to build a house of cards? A smooth floor (like wood or tile) or carpet? Why do you think this?

To explore this, build the following structure on a few different surfaces. Which surface was the easiest to use? In particular, think about the size of the triangle that you were able to make for the first layer [see pictures on next page].

Context Matters Pictures





Raising the Roof

Your next challenge is to try to build levels to your house of cards. How many levels can you build? To help you think about how to make each additional floor of your house, review the pictures below. How have the playing cards been arranged in each picture? How do you think they are able to remain standing?

One big force that acts on your playing card house results from the weight of the cards. Your house must counteract that weight by pushing upwards on the cards added to each layer. If your house can't push upwards as hard as the cards push downwards, then the cards will break your house and move downwards. Since the force of the cards pushing downwards exceeds the force of the house pushing upwards, we call that an unbalanced force.

How do you think your cards would react to additional weight placed on them? Return to one of your earlier structures, like this one. Now place a small weight (like a toy) on the top. What happens to the cards in each triangle?

Reflection Questions

- Which designs were more successful in building a house of cards that could stay upright?
- What was the best way you found to build a second (or third) level?
- How did you change your way of building the house of cards if your first design did not work out?

Sharing your house of cards on Instagram or email.

We want to see your house of cards! With permission from your parent or guardian, share a picture of your house of cards for our instagram page. By direct messaging or emailing an image of your challenge gives us the written consent to redistribute the image on our official instagram page.

Instagram: @sciencecircuswhittier Email: sciencecircuswhittier@gmail.com

This activity is intended for use by adults and children who can read and follow directions and warnings. Adult supervision advised.