Sideways Tower Challenge

Introduction

People love building things that are tall! If you give small children a bunch of blocks, they will almost instinctively start stacking them, one on top of the next, until the tower falls over. Countless STEM and STEAM challenges instruct students to build the highest tower out of random items like sticky notes notes or pipe-cleaners. Even big business owners have competed for generations to have the tallest buildings.

Building something that supports itself as it gets taller only presents one set of challenges. The challenges are completely different when building something that has to support itself while sticking out sideways. That's what this challenge is all about.

Extra information:

Before you start click this link to watch a short video all about how folding makes paper stronger:
https://vimeo.com/408126677/ba2db66d99

Materials

Sheets of paper
Clear tape or masking tape
Safety scissors
Tape Measure

Rules

The structures must be self supporting:

- Tall Towers cannot be leaning on walls or other objects.
- Towers cannot be hanging from the ceiling or other objects.
- Towers can not have other objects or materials used to hold them up.
- Sideways Towers may only be attached to the table or wall that they are sticking out from.

Use no more than 3 sheets of paper for each tower.
The paper may be cut into pieces.
Tape may be used to hold the pieces of paper together.
The base of the structure can be taped to the table or whatever surface you are building on.

The Challenge

STEP ONE: Building up

Inventing – Think about how to build the tallest possible structure.
Sketch out your ideas.
Making - Choose the idea or ideas you think will work best.
Build the tower.
Measure the height of the tower.

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STEP TWO: Thinking Sideways

Inventing- Think of how you would build a new structure to stick out from a wall or side of a table.
Sketch out your ideas.

Making- Choose the idea or ideas you think will work best.
Build your sideways tower.
Measure the length of your tower

STEP THREE: Storytelling

Option 1- Take pictures of your towers.
Send the pictures to your teacher along with the answers to the following questions:

1. When building the two towers, what did you try that didn't work?
2. When building the two towers, what did you try that did work?
3. What was the height of your tall tower?
4. What was the length of your sideways tower?
5. Which was harder to build and why?

Option 2- Take a video showing your towers.
In your video talk about what you did.
In the video make sure to answer all the questions listed in Option 1.

Additional Challenge

Do this challenge again.
Using what you learned from your last attempts, try to improve your results.
In addition to answering the questions above, answer the following questions:

1. What did you do differently when making your newer towers?
2. Which towers were more successful? Why?

Lessons Learned

Building things with non-standard building materials is a great way for students to learn about physics and engineering. This activity challenges students to overcome gravity in two ways. By building for height and then building for length with nothing underneath, students get to experience the dynamic differences between the effects of gravity on a tall structure supporting itself from underneath versus a long structure that must remain rigid without additional support.

Additionally, students use creativity and critical thinking to identify the problems, propose solutions to those problems, enact the solutions, and evaluate the results.

Finally, students must communicate their discoveries either with pictures and written responses or through the use of video. Both options have their own educational merits, whether it's the experience of communicating visually through pictures and the written word, or by organizing ideas and presenting them verbally in a video.