

Sideways Tower Challenge



A Towering Disagreement

When danger rears its ugly head (...okay, usually it's when the evil Balzer rears his ugly head) Walt and Sue Inventson are a great team. When they work together, Walt's analytical mind paired with Sue's fearless confidence makes them a force to be reckoned with. However, they are still brother and sister, and brothers and sisters argue!

Jesse, the youngest Inventson, woke up this morning to the sounds of Walt and Sue bickering about a new clubhouse they want to build.

"All the most impressive architectural feats are built tall!" yelled Walt with his arms stretched high over his head.

"Tall is boring. Where's the challenge in that? We should build a cantilever design! We can build off of the side of the mountain and have it sticking out sideways overlooking all of Inventionland!" explained Sue, with a look of wonder in her eyes.

"ENOUGH!" cried Jesse, jumping in between them. "There's only one way to settle this. You need to build models of both designs and then you can compare your ideas!"

"That's a great Idea, Jesse!" said Walt excitedly.

"Yeah! **MY** model will be amazing!" Sue taunted.

"Great! You guys get to work. While you do that, I'm going back to bed!" said Jesse. With that, he went back into his room and slammed the door.

Sideways Tower Challenge

Overview

Help the Inventsons settle their argument. First, build the tallest tower you can out of paper. Then, build one that hangs out sideways from a table or wall. See which one is harder to build and why.

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

Rules

Get a parent or guardian's permission before you start!

The towers must stay up on their own.

- The tall tower cannot be leaning on anything.
- Neither towers can be hanging from the ceiling or other objects.
- The towers can ONLY be held up with tape and paper- no other objects or materials.
- 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 - Build the tower.

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- Build your sideways tower.

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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. Which one 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:

Using a tape measure, measure the height of your tall tower and the length of the sideways tower.

Record the results.

Do this challenge again.

Measure your new towers and compare the results to your first towers.

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 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.