mystery science

Grades K-5
Mini-Lesson: “What’s the tallest skyscraper anyone can build?”

VIDEO TRANSCRIPT

VIDEO 1

Hi, it's Doug! Have you ever played the game Jenga? Some people are able to build some pretty tall towers. Like, check out this, the world record. This person piled 485 blocks on one single Jenga block. That's some amazing balancing skills. Someone named Ashley has a question about building things. Let's give Ashley a call now.

[Video Call]

- Hi, Doug!

- Hi, Ashley!

- I have a question for you. What's the tallest skyscraper anyone can build?

- Oh, that's a great question.

Humans have been trying to build super tall things for a long time. Before skyscrapers were invented pyramids were the tallest objects built on Earth. Take a look at this one. It's called the Great Pyramid of Giza. Builders stacked over two million heavy stone blocks to make it that high. The pyramid was the tallest human-made thing on Earth for almost 4,000 years until this came along. This is the Lincoln Cathedral and it was once over 500 feet tall. But then something happened. If you've ever built a tower with blocks, you've probably noticed that the taller you build, the harder it gets, and that's what happened to the Lincoln Cathedral. The tallest part

toppled over during a storm. It was just too tall. when it was built, people just couldn't build things that were very tall yet. Before I go on, I'm curious. Why couldn't those earlier pyramids and cathedrals be built as high as skyscrapers are today? What do you think?

VIDEO 2

Well, I'm not sure how you answered, but you might think that the earlier buildings weren't made of very strong materials, but that's not really what's most important. Bricks and stone blocks are incredibly strong. It turns out it's the piling up of bricks or stone blocks that creates the problem. You see, buildings back then were made by piling bricks or stones on top of each other. The taller the building, the more bricks they would use. And the more bricks they would use, the heavier the building would get. If it got too heavy, it could collapse from its own weight or it could topple over. So the piling up of bricks or stone blocks is what kept people from making really tall buildings. Since then, we figured out how to build even taller buildings, buildings that are way taller than the first pyramids and cathedrals, buildings that seem to scrape the sky. These buildings, called skyscrapers, are now the tallest human-made objects on earth, and they don't fall down! How is that even possible? Well, building a skyscraper involves a totally different way of creating a building. Rather than stacking up building blocks the way they did with pyramids or the way you do in Jenga, it involves giving the building a skeleton or structure on the inside. This new way of building led to the first-ever skyscraper, the Home Insurance Building in Chicago. Instead of building with piled-up bricks, it was built with a steel skeleton. And since the skeleton was holding the building up, the rest of the building, like walls and windows, could be hung on the steel beams like pictures hanging on walls. And since those walls didn't need to be made out of piled-up bricks anymore, they could be really light, at least much less heavy than building materials of the past. This changed everything. By building with steel skeletons instead

of heavy bricks, builders could build taller than ever. Now, even with a skeleton, there was another thing that could knock it over—wind. A skyscraper is like a giant sail. The taller it is, the more wind pushes into it. And those winds can actually knock a skyscraper down. So skyscraper builders are constantly trying to find ways to get around this problem like the builders of this skyscraper did. This is one of the tallest skyscrapers in the world. You see the shape of the sides? Why do you think they built it this way? It's all because of the wind. The spiral shape helps the wind twist around it instead of crashing into it. And take a look at this one. You notice the top? Some skyscrapers are even built with holes in them so that the wind blows straight through. Now, by inventing new ways to trick the wind, we've been able to build from 88 floors to 101 floors to the tallest skyscraper in the world. Currently, the Burj Khalifa, it's 163 floors tall. And that brings us back to our question, how tall can a skyscraper be? Well, no one really knows for sure how tall, but we are sure of this: we can build a lot higher than the skyscrapers we have today. In fact, builders in Japan are planning to build a skyscraper that's one mile tall. It's called the Sky Mile Tower. And when it's finished, it will be more than 10 times the height of The Great Pyramid of Giza. That's twice as tall as the tallest skyscraper we have now. That's all for this week's question. Thanks, Ashley, for asking it!