mystery science

Lesson: “How can you knock down a wall made of concrete?”

VIDEO TRANSCRIPT

EXPLORATION VIDEO 1

Hi, it's Doug! Imagine that you went to open your bedroom door one day and it was jammed, it was stuck. What would you do? You'd probably give it a good strong push, right? Or maybe a good strong pull, depending on how your door opens. But what if, instead of your door being stuck, you went to open your door and there was a wall there. Now, just giving a good push with your body wouldn't do anything. It's a wall! Maybe you'd have to take a large hammer to it. That would be a strong push, that might work. But what if the wall were made of concrete. I mean, solid rock. Well, let me tell you a true story about a famous wall. It was a wall in Europe, in the country of Germany, right here. Their biggest city there is called Berlin. Now, today, Berlin is a fun place to visit—there's lots to see and do. But, long ago, there was some trouble in Berlin. Around the time that your great-grandparents were growing up, the city of Berlin got divided into two very different parts. One side of the city, East Berlin, got taken over by people who didn't want the people of East Berlin to be free. These people didn't let people choose their own jobs, or own their own things. Most of the people of East Berlin didn't like that, so they began to move to the other, free side of the city. But the people in charge of East Berlin, they didn't want everyone to leave and be free. So, they built a giant wall around their side of the city so that no one else could leave. Here's what the wall looked like. This really happened. The wall was there

for 40 years. The people living in East Berlin were stuck. They were not allowed to leave, even if they had friends and relatives over on the other side of the wall. Finally, in the year 1989, the people in charge of East Berlin began to see how horrible it was that they built this wall and kept everyone in. They changed their minds and decided we should tear down this wall. But now there was a problem. How would they tear it down? It's a big wall, about 12 feet high, way taller than any person. And it was made of concrete. I have a question for you. I sent it to your teacher so that you can read it together.

EXPLORATION VIDEO 2

So, how would you knock down a concrete wall? You might think to use a hammer. They even make really big hammers, like this, called a sledgehammer. As you swing a sledgehammer and bash the concrete, that gives the concrete a huge push. So much so that it can knock out a chunk here or there. But still, a sledgehammer like this isn't going to be enough to take down an entire concrete wall the length of a city. You need a bigger push for that. These days, specially trained workers use explosives that can make concrete buildings blow up if they need to get rid of them. Let's watch. Wow. An explosion makes a really big push. So, using explosives can work, but you should know there have been mistakes. Watch this. Here are some people getting rid of a tower. Seems like everything's okay until—uh oh. Oh no. That's terrible. They wanted the tower to fall the other way, not toward the telephone poles. Now, thankfully, no one was hurt here. Here's another one where something went wrong. Let's watch. Whoa. When they tried to blow up that old building, it rolled over, and it almost hit this apartment building next to it. It was close. Now, thankfully, again, no one was hurt here. But this is something to think about. The biggest problem with knocking down the Berlin Wall is that it was right down the middle of the city, and there were apartments and houses next to it. They wanted to knock down the wall, but

they didn't want it to accidentally fall on any of the houses or buildings that were near it. So how would you knock down a concrete wall without harming any of the houses or buildings on either side? We still need something that can do the different work words of pushing to take down the wall. Whether it's something that bumps the wall, or crashes into it, or makes it blow up. Those could all work. We just can't push so hard that it knocks into the houses too. Using explosives might be too big of a push, but there is a machine that can bash the wall more safely. Maybe you've heard of it. It's called a wrecking ball. A wrecking ball is really heavy, so when it hits, it hits with a big push on the wall, knocking out chunks of concrete at a time. Still, you have to be careful. If it hits too hard, the wall could go flying and damage the buildings on either side. You need the push of the wrecking ball to be just hard enough to knock the wall down, and not any harder. In today's activity, you're going to figure out how to change the strength of a wrecking ball's push so you can knock down the Berlin Wall safely. Before we begin, take a minute and think about what you might do. How can you make a wrecking ball hit harder? How can you make it hit not as hard? What do you think?

ACTIVITY INTRODUCTION VIDEO

In today's activity, you're going to play a game called Don't Crush That House. You're going to build a wall out of cups and knock it down with a paper wrecking ball, like this: pull it back and let it go. But there's a little problem. Your wall of cups is like that wall in Berlin. Because right behind your wall, there are two paper houses. You want to knock down the wall, but you don't want to push on the wall so hard that it falls on people's homes. So you're going to have to think about how hard you hit the wall with your wrecking ball. Hit it too hard, and you'll crush someone's house. Here's how you play the game. You pull back the wrecking ball and let it go. If your wall of cups hits a house, like this, your turn is over. But if your cups don't hit the houses,

like this, then you get to swing the wrecking ball again. You can keep swinging as long as you don't hit a house. Once you knock down all three cups without hitting the houses, you win. I'll show you how to get started, step by step.

ACTIVITY STEP 1

If you're in a class, form a group for each game station. If you're at home, you can play the game by yourself. When you're done with this step, press the arrow on the right.

ACTIVITY STEP 2

Before you can play, you need to know how to set up the houses and cups. You're going to put the paper houses on the drawings of the houses, and the wall of cups on the drawing of the cups. Now that you know this, go to the next step.

ACTIVITY STEP 3

Go to a game station and set up the houses and wall of cups. You'll have to set it up like this after every time someone takes a turn.

ACTIVITY STEP 4

It's time to play. Pull back the wrecking ball and let go. Try to knock down the wall without hitting houses. Remember, if you don't hit a house, you try again. If you hit a house, your turn is over. Let everyone who's playing have a turn. Okay, time to play.

ACTIVITY STEP 5

If you let go of the wrecking ball from here, do you think the cups would hit the houses? Why or why not?

ACTIVITY STEP 6

If you let go of the wrecking ball from here instead, do you think the cups would hit the houses? Why or why not?