Lesson: “How can you knock down a heavy wall?”

VIDEO TRANSCRIPT

EXPLORATION VIDEO 1

Hi. It's Jay from the Mystery Science team. When I was a kid, I loved building block towers. And even more than building them, I loved knocking them down. Maybe you love knocking stuff over like this too. This one time, I decided to build a big wall of blocks. Next to my wall, my friends were having a tea party with their stuffed animals. The taller and taller I built my wall, the harder it was to see my friends and their party. Once my wall was built, it was time for my favorite part. It was time to knock it down. I wanted all the blocks to come down with one push. So I gave the blocks a big push, and they all came crashing to the ground. But, oh no, I'd forgotten that my friends were on the other side of the wall. When I gave the wall a big push, the blocks crashed right into my friend's tea party. I felt so bad. It was a big mess. You might not have accidentally wrecked a tea party before like I did, but I'm sure you have given something a big push or a big pull. And maybe you've seen some bigger pushes and pulls. Like, check out this person pushing a shopping cart, or this beaver pulling a log. But other times, you don't need a big push to move something. Sometimes even just a little push can make something move. We're going to play a game where we'll imagine pushing things. Let's start with this tall tower of blocks. Imagine you need to knock down the whole thing. Would you need a big push, or could you use just a little

push? If you think a big push, push with both hands like this. If you think a little push, push with one finger like this.

EXPLORATION VIDEO 2

Sometimes a little push is all you need. Other times you need a bigger push. And other times you need a really, really big push. Sometimes construction workers need to knock down something like this, a whole entire building. So they need some way of giving it a super big push. This is a wrecking ball. It's a tool used by construction workers when they need to give something a really big push to knock it down. Watch how it works. Woah. When a wrecking ball smashes into a building, it gives a huge push. But construction workers have to be careful. Sometimes you want to knock down one thing but not everything around it. Like, what if you need to knock down this crumbling wall, but you don't want to hurt the houses on the street behind it? It's like my tea party disaster. But instead of blocks, these are real bricks. And instead of wrecking a friend's game, this could wreck someone's whole house. Yikes. If the wrecking ball gives a push that is too strong, it can knock down too much. If the wrecking ball gives a push that is too weak, it will knock down too little. It won't get the job done. So construction workers have to be careful how strong a push the wrecking ball gives. It has to be just right.

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. 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?

WRAP-UP VIDEO

In the activity, you found out how to move the wrecking ball so it gave just enough push to knock over your wall of cups, but not the houses behind. When you moved the wrecking ball, you gave it a pull. But when you let go, the wrecking ball swung forward and gave the wall of cups a push. If you pulled the wrecking ball way back and let it go, the wall of cups got a big push. If you pulled the wrecking ball only a little, the wall just got a little push. If the wrecking ball gave too strong a push, cups got knocked over, but so did houses. Whoops. But if you gave too weak a push, not enough of the cups fell down. The strength of the push matters a lot. Real construction workers deal with this problem too. They have to carefully measure how strong the push of their wrecking ball is so they can knock down what they need to and not what they don't. So whether you're demolishing a whole building to make space for something new or pushing over a tower of blocks, pushes and pulls are important. Next time you push a box out of the way or pull open a door to go somewhere, pay attention to how strong your push or pull is. Is it a big push or just a little push? Have fun, and stay curious.