mystery science

Grades K-5
Mini-Lesson: “What’s the fastest baseball ever thrown?”

VIDEO TRANSCRIPT

VIDEO 1

Hi, it's Doug! This is professional baseball player, Jim Abbott. He's considered by many to be one of the best baseball throwers, or pitchers, that's ever played. What makes him even more incredible, is that while the players he played against use two hands, one to catch and one to throw, Jim Abbott had to do it all with one. That's because Jim Abbott was born with only one hand, but that didn't stop him from being an amazing player. You notice how he switches his glove super fast? That's so that he can throw the ball after he catches it. So cool! Someone named Eli has a question about baseball. Let's give Eli a call now.

[Video Call]

- Hi, Doug!

- Hi, Eli!

- I have a question for you. What is the fastest baseball ever thrown?

- That's a great question.

Now, technically, the answer to this question, is that the fastest baseball ever thrown is this throw, right here. You see that, these are astronauts playing baseball on the International Space Station, and that baseball they threw, it's traveling nearly 17,500 miles an hour. That's more than

150 times faster than any baseball player has ever thrown. Wait, what? It didn't look like it was that fast. Well, that's why I said technically. The Space Station is high up in space, circling around the Earth at a speed of 17,500 miles an hour. So anything thrown while on the Space Station, is also going 17,500 miles an hour, plus a little bit. Okay, but that's not really what we have in mind when we wonder about the fastest baseball ever thrown. What's the fastest baseball ever thrown down here on planet Earth? Well, first of all, just to give you a sense of a usual speed for a pitch, a typical grownup can throw a baseball about 40 to 50 miles per hour. That's about twice as fast as the fastest human runners on Earth. But there are some people, like people who throw baseballs for a living, professional baseball pitchers, that can throw a lot faster. And some of them aren't even adults, like Raine Padgham. Raine can throw a baseball over 80 miles an hour. That's faster than the cars you see speeding by on the freeway, and get this, Raine is only 15 years old. And check out Jordan Hicks. Jordan is one of the fastest pitchers in the world. Jordan's throws go more than 100 miles per hour. Whoa, that's really fast! So how do people like Raine and Jordan throw that fast? I mean, the typical kid can't even throw half that fast. Do these baseball pitchers have some superhuman powers? Before I say anything more, I'm curious. What do you think? How do you think baseball players throw that fast?

VIDEO 2

Now, I don't know how you answered but you may have thought that professional baseball pitchers are a lot stronger than most people and that makes sense. It seems like you would need to be really strong to throw a baseball that fast. Check out these chimpanzees. Though they look kind of small and cute, chimpanzees are a lot stronger than human beings. And they could easily beat a grownup in a wrestling match. So if being strong is the most important thing, then chimpanzees should be able to pitch a lot faster than humans, right? But they can't. In fact,

a lot of kindergartners can pitch faster than a chimpanzee. Hmm, so if being strong isn't the main thing, what is? Well, when you throw something, it's not just about the muscles in your arms and shoulders. The bones in your arm and shoulder have to move together as well. And our bones are connected to each other by rubber band-like things called ligaments. Watch this, notice how baseball pitchers twist their bodies around when they pitch. When a pitcher winds up their body and pulls their arm back, the ligaments in their arms stretch out and get ready to make the ball blast off. See how this pitcher pulls his arm way back? He's stretching his ligaments out as far as he can, which builds up energy in his shoulder. It's exactly like when you pull back on a rubber band, like on a water balloon launcher. The more you can stretch it back, the faster the water balloon is going to fly. When the pitcher releases the ball, it's just like letting go of that rubber band and launching the water balloon, and all that energy gets released into the ball. Okay, so if what makes a pitch fast is learning how to wind up and stretch your ligaments out as far as you can, does that mean anyone can learn how to throw as fast as the fastest pitchers? Well, not quite. Even though there are thousands of professional pitchers, there have only been a few who've been able to throw faster than 100 miles per hour, like Aroldis Chapman. He holds the World Record for the fastest pitch ever thrown. 105 miles per hour. So how did he do it? Well, scientists who study the human body think that one of the reasons pitchers like Aroldis Chapman are able to throw faster than anyone else is because some people's ligaments are just stretchier than others. And the more they can stretch, the more energy they can give to their arm when they throw. How stretchy someone's ligaments are might just be an ability only certain people are born with. Some scientists also think that human beings will never be able to throw much faster than Aroldis does. That's because the ligaments in our arms just can't stretch much farther without snapping. Just like a rubber band would snap if you stretched it out too far. But even though people can't throw faster, that doesn't mean

machines can't. Meet the Supersonic Baseball Cannon. It pitched a baseball over 1,000 miles per hour, the fastest pitch ever thrown. Its pitches are so fast that the ball would explode if it ever hit a bat. So in summary, pitchers are able to throw fast because they're really good at stretching the ligaments in their shoulders and launching the ball forward like a water balloon launcher launches a balloon. Some pitchers are able to stretch their ligaments farther than other people, like Aroldis Chapman, who's thrown the fastest pitch ever. That's all for this week's question. Thanks, Eli, for asking it!