Transcript for I Built a Roller Coaster In My Lab

This is the most epic birthday party ever! It's got a jet power tie-to-swing, a custom-built roller coaster, and an indoor sledding hill with axle-slap! Oh! And I said all this up, surprised the world's most deserving kids. Safety is for losers! Yeah! I'm importantly three months ago, one of this existed, because that's when I reached out to a friend of mine who many considered to be the greatest engineer this world's ever known. Oh, hey, Mark! Phidias! I'm planning on throwing the world's greatest birthday party for this kid named Ethan. I can explain later. For now, I need you know what you've got in the idea. Oh, that's a great question, Mark. One time, Furb and I made the world's first rocket-powered tire-swing, you'll just need a tire, you're standard-elemon parts, don't forget your high-powered rockets. Oh, and as you can see, as long as you don't remove this screw, you'll be fine. You do realize that brings like seven laws of physics, right? Well, we're working with cartoon physics, but I trust you can figure it out. In the meantime, I was thinking Furb and I could take a crack at your world record breaking elephant toothpaste experiment. Ooh, why the heck would we both have our work cut out for us? I'll talk to you later. Now, I knew for personal experience if you can pull off a finies-sum Furb invention in real life, it makes for a really epic party with 15 tons of jello to spare. But the problem here was their rocket-powered tire-swing, leaned very heavily on the creative boundaries of cartoon physics with estimated peak forces that would be 35 times when a human could endure. So it was the first pass. I just let two rockets with 2,500 Newton-second total impulse to a single chain mounted to a tire-swing, and generously gave our 180-pound crash test dummy Newton first dibs on the ride of his life. Initiator is on. This is the test my hypothesis. Why finies-sum Furb is an animated show. Three, two, one. One. One. One. One. One. One. And after the smoke cleared, we lost our fans. That was the most powerful, depancing in history. The single chain is going to make it tough. So to keep us from immediately spinning out of control, and potentially losing all our dignity in the process, we doubled the chains for more stability. Here we go. And this time, let it rip. The exact same thing happened. No. He can't keep his clothes on. I think only one of them ignited. And a high-speed camera replay revealed, that's exactly what happened. So once we fix the fault to the ignition wire, we try it again. Go! No! I can't! How's he Newton? Which I'll remind you, ways more than I do. To launch 10 feet into the air, completing the stylish dismount. That was definitely both that time. It's Tuesday, Ron! That's a W. And while the dual chain configuration did provide a lot more stability, the slow move revealed it was really no way to reliably keep the thrust factor aligned in the best direction to loop us around. This is too squirrely. We need to go to rigid chains. To fix that, we swapped the two chains with two solid rods. Igniteers hot. Three, two, one. Go! Go! Go! Go! Go! Go! You can see here, the rocket forces were so high. It ripped our entire half-tun steel swing structure out from the stakes, anchoring it into the ground. That's the- You got-you got- Alright, well that's a successful rocket swing. Now we just got to figure out how to make it slightly more safe. So we were off to a promising start. We just needed a little more inspiration. Hey, Mark, how's the build? It's got a little work left, but it's getting less lethal by the minute. I do feel, though, that the party needs a little something more. I've got it. How about your build on my backyard roller culture like the one we made at the beginning of summer? Feel tracks, cards, with seat belts, and of course be sure to add extra thermal shielding for when you re-enter the atmosphere. Aren't you a little young to be building things that require extra thermal shielding for when they re-enter the atmosphere? Yes, yes I am. Well, the block. Oh, gotta go. Herb just arrived with. Oh, our store of the show. No, Phineas, you don't need a tiny- Tile it, Mark. Oh, that's gonna get messy. Now the good thing about roller coasters is unlike two story tall rock-a-power tire swings. Roller coasters actually exist. So I did what any self-respecting engineer would do as a first step and conducted some tedious research. Now I knew that finding the perfect Goldilocks zone for our birthday guests would be critical. Not so extreme, it sends him back to the hospital, but also not so boring, it feels like watching William Austin video. So armed with all the learnings from our TES research, we set up to build the perfect indoor roller coaster for my buddy Ethan. By the way, this is Ethan. And when you should know about Ethan, is he was recently diagnosed with a rare and severely debilitating neurological condition that left him bedridden, causing him to miss most of his school year. In fact, his pain in nausea was so severe, he couldn't even walk from one room to another. Other thing you should know about Ethan is he's incredibly resilient. And after a full year, he'd recovered enough to make his way back to school. And his luck would have it. He not only had a birthday party coming up, but he was also a massive finise in Furb fan, which was perfect because we had our first prototype of the world's greatest finise in Furb indoor roller coaster ready to test. OK, man, here we go! Let's go, let's go! Oh yeah! I think we're going to have to check our calculations. So I called up some of my buddies who are really good at this. And they introduced me to the efficiency of their calculations, why introduce them, to the efficiency of a 10 second build montage. And while not yet perfect, we were certainly on the right track. Now we just needed a few more of them. Good. And things were coming along great, but if I was going to get approval from the world's most creative engineer, it would need a little something extra. So I took a closer look at their original coaster. And while we definitely can't send even to France, we definitely could send them through a steak drop, a mud bucket, and a full-on car wash. Snakes on a train in 321. Snakes? This build was elegant. Our snakes bearing beautifully with a catapult calibrated mud bath. Ah! That's why we're safety classes. Why are you smiling so much? You're ready? Ah! Followed by a cleansing soap scrub, infused with eucalyptus soil, and 40 miles an hour. That out of debt. They're needed bit of a rinse off, and finally air drying with a gentle breeze. OK. OK. Clean as a whistle. Oh, good. So now it's both the roller coaster and the rocket's been pretty much ready to go. I opted for a check-in. Hey, Mark, how's it going? I mean, it's getting there. But how do we really make this the best birthday party ever? How about... Swinter. It's like summer, in winter. All you need is a snilco maker and a bunch of jet-powered fans. But be sure to keep it windows closed. You really don't want to bring Swinter inside your house. The news? You pointed head of genius. I think you're onto something. Oh, right. Oh, while I have you, Urban Eye will wondering if your elephant prefers mint or bubble gum flavoring. Neither. Don't you boys think you're taking this a little too literally? No, no, we don't. All right, we'll see ya. You know that. Snowing indoors? I'll get this be. Turns out a lot harder than the cartoon solution of Snowco maker's fans. So I invited out an old friend to help. Oh, my god. This is crazy. This is fletcher. And if you look familiar to you, that's because five years ago I surprised him with a special birthday party of his own, where he triggered the first ever devils toothpaste explosion and then broke the world record for the highest elephant. The best experiment. Now, the time fletcher was dealing with a very rare form of brain cancer and since so many of you have asked for an update over the years, here it is. I'm five years free of any sign of disease and I'm a senior in high school that's going to college. And you are almost as tall as me. I'm going to say, I'm still taller. So I explained to him the engineering challenge of creating a non-cart tune indoors. Snowstorm. Fletcher was all right. Let's do it. Yeah, the problem is I don't know how. I don't have the... Look at him. With that uninspiring kickoff, we decided to just try some items we had lying around crunchlets. I'm far the last one. Our first thought was grading styrofoam, but it turns out that's not only dangerous. Ow! Just created my finger. But the static electricity buildup means it would rather stick to you than the ground. This up was using that water absorbing callover you find a diapers. But it turns out it's not very good for making so balls. It's way too slippery. And I'm gonna pop that. The amount of diapers required would be half a metric, but which all left us with only one option. Hold this. Here we go! I'm being 80,000 pounds of actual ice into a woodchomp. I think it's going to work. What's like came in to check things out? All right, flesh, what do you think? It didn't take long for Flight sure to let the power go to his hand. Mark, you okay? Yeah, I'm fine. But this is good or great. Now that we had a solution in hand, I need to flex your help on one last finishing touch. Oh, it was Nathan. After which you abruptly told me he had to go. See you later. What? Man, this is gonna take a while. A lot longer now with one person. We're back in snow! Let's go! Four hours and 40 tons of ice later. All that was left was to nail the surprise. Eight months of planning and where it comes down to this moment. There he is. Oh gosh, my heart's about to beat out of my chest. We had either parents tell him he was auditioning for a toy commercial, so he wouldn't suspect anything. We laid eyes on a balloon laden indoor roller coaster, resting on two feet of freshly packs. No. That's cold. Because he's been was catching on quick. Why is there a crunch laden? Nathan. What's going on, pal? No. No. No. I thought you might need a coat. Wait, I'm so confused. What is your favorite cartoon? Finiessen firm, probably. Have you seen the episode where the make the rocket powered swing? Yeah. Have you seen the episode where they send the roller coaster to space? Yeah. Have you seen the episode Ethan called Swinter? Where they turned inside into winter? Yeah. This is Finiessen firm in real life. I'm throwing you a birthday party today. What? No. Uh-huh. You know what a banger party needs, Ethan? A birthday cake? It doesn't need a cake. Let's work on a cake. You know what it also needs, though. Feel like we should have more people here. You have friends you'd want to invite? Yeah. And that was the cue to send in. All of Ethan's best friends. And also his loudest friends. Ethan is a little sister, which meant that he had an important decision to make. Ethan is it okay if they all hang out with us? Ethan you better say yes. Fine, but I have something to say. Okay, that was from you. Yeah. What do you guys say? We started the rocket swing. Yeah. Before we kick off the party, I realize you're probably looking for a good way to spend Your 104 days of summer vacation. We'll look no further because it's here and it's called Camp Crunch Labs. Camp Crunch Labs is your key to fighting that summer brain tree. With an eight week virtual space theme summer camp that hops to each of the planets in our solar system. Featuring weekly videos with mega experiments that I do. And super challenges that you and the best of these weekly challenge submissions earns one of these bad boys to platinum ticket. Giving you the chance to join me on my favorite planet for the biggest mega experiment of them all in the final episode of a summer. I'll tell you that usually the Crunch Labs bill boxes where they super fun toy together learning all the juicy physics how they work comes once a month. But to coincide with space camp Crunch Labs weekly challenges and videos all summer long We'll ship them to you every week. Let's go. So if you want an eight week summer camp where you could travel the cosmos while learning to think like an engineer. With an absolute zero percent chance of bug bites of poison ivy. And the camp Crunch Labs stock comers are one of the limited spots and I'll see you in camp. Back at the party it was time to see if I'd actually accomplished turning three finnies and fur of cartoon marbles into real life. Starting first with the rockets. You guys want to see it. You might notice we swapped the rockets out for a pair of 24 volt electric turbines. Miss provided two advantages first. We learned from testing that big rockets. We gave a lot of smoke. But what's your breath? Which is not ideal for your lungs or your smoke alarm. And second if you post the turbines at the exact natural frequency of the swing. Which is exactly what you naturally do when you pump your legs on a swing by the way. Then you can add more and more energy to the swing. Tell us enough. Mark Mark Mark Mark Mark. Do clear the bar. Yeah! Yeah! Yeah! Yeah! And even with their modifications, he thought suddenly occurred. That's a really dangerous. My protest fell on deaf ears. Safety is for losers. Yeah! See you as you with such a tough guy all of a sudden. I decided to use Ethan to get a baseline. Here we go. There we go. Just seeing how high you could swing if you just had to rely on your boring old mussels. Wow! And the answer was pretty much horizontal. Ethan, you're kind of going high. I shmied. Now, it was my turn to see what would have been if you added 14,000 RPMs of propulsion. Okay, are you guys ready? Of course, the number one rule when demoing a potentially disastrous engineering bill that a kid's birthday is that you definitely want to do it before you- I've never done this before. What do you mean you've never done this before? How has he been tested? No! No! Oh! Oh! Oh, my God! Oh! Oh! Oh! Oh! Oh! Oh! Oh! And the only feeling better than pulling off a bill like this is how you feel when you finally get off the bill. Oh my God! That looks so nauseating. Ethan, you're next! Yeah! Before we got to the big roller coaster finale, I decided we should take a little swim to break, starting with some snow cones. Who ready for a snowball fight? And some snowballs. However, unfortunately for them, certain habits- Yeah! Or hard to kick. Oh! Oh! Headshot! Who's next? Oh! That was awesome! All right! Yeah! And then suddenly, and very undeservedly, I might add. I wasn't over my head. Why is everyone aiming at me? Okay, true? Who wants to go sledding? Yeah! Oh! Oh! Oh! Woo! Don't hide me! I thought that was- Ethan was really encouraging with his friends. Soy! That is when he was in the tackle. Oh yeah! Go back! After we had our filled with snowballs and sledding, it was time to test out the final and most audacious, Phoenies and Furbin real life engineering build. Now up the stakes, Ethan reminded me what their coaster was actually like in the show. There was like snagged and like a car wash and a bunch of stuff. So if this is really Phoenies Furbin- It would be a triangle. Oh yeah! If this was Phoenies Furbin, it would be a triangle fair fair. But I wasn't going to make Ethan ride solo. So I had no choice but to buckle up. I've never met Phoenies and Furbin. Oh yeah! This was Phoenies Furbin. So I had no choice but to buckle up. I've never met Ethan or you know this. Three! One! Two! One! Go! No! No! No! No! No! No! No! No! No! No! No! No! No! And while the stakes were fake, the mud was real. No! No! No! No! That's one of the stuff of course. So Mr. Rizzoff in Science Bob's 20 mile an hour car was. No! No! No! No! No! No! No! For pulling to a halt in front of a massive blow dryer so we could try off. Nice and clean. Oh! Oh! You won't have to shower tonight, at least. I doubt that, but um. So now that all three of our mentions were tested and Ethan approved. Thank you. It was time to give Ethan a well deserved 15 second party by post. Music Music Ethan, now I'll have a confession. I didn't pull this off on my own. I had a little help. What do you mean? Hey, friendies! Look what we did! Well, you know for not relying on Cartoon physics, that looks so fun. Unhappy at all worked out for you. Now for the elephant toothpaste experiment. Well make sure firm isn't too close. Ha ha, oops. Wow, it looks like you got a lot of cleanup on your hand. You want us to help? Actually our cleanup usually takes care of itself. See? No must, no fuss. Bye, Mark. Sorry, Ethan, but that trick will not work in real life. Am I cleaning up? A grab a shovel, let's clean this up. Oh my god. Woo. Ha ha ha. Now that Ethan's been given the best birthday ever, why not join us for the best summer-end. Space Camp Crunchy-Lat. Eight-week virtual space theme summer camp designed to help fight that summer brain drainage. Since you got canned crunch locks off top of parents and a sort of a little bit of spots, it'll snow with camp.