

“How You—and the Science Club—Broke It Down” Excerpt Transcript

Excerpt from [December 9, 2016](#) episode of Science Friday.

IRA FLATOW: This is Science Friday. I'm Ira Flatow. [COMPUTER NOISES]

There it is. That sound means that Science Friday Science Club is back in session, here to wind up another unique project. This one is called Break It Down. And the point of the project was to find stuff, break it to see what's inside, and let us know what you found.

Joining me now are the founders of the Science Club, Science Friday's education manager Ariel Zych, and director Charles Bergquist. Welcome to the program.

ARIEL ZYCH: Hi.

CHARLES BERGQUIST: Thanks, Ira.

FLATOW: Well, so Ariel, the project was, break it down take it apart.

ZYCH: Absolutely.

FLATOW: Hit it with a sledgehammer.

ZYCH: Get in there any way you can. We wanted those objects in your life, or those things around you that are just too complex to understand up front, right? So that stuff that you really have to simplify and pull apart and look inside to understand how they work. That was the invitation. So everybody out there who broke something down, I bet you figured out something super cool.

FLATOW: And one of the most surprising things about this project was the number of people who chose to take their pens apart.

ZYCH: Yes, the pen!

FLATOW: Especially the-- let me click mine, my retractable ball pen! [CLICKING] Yes, kind of springy and clicky thing. So joining me now to walk us through the magic of the clicky pen is Will Link. He's an engineer and product manager in the stationery division of Bic. Bic Pen, you know, Bic International. You probably have one in their pens, like this one, right near you. He joins me by phone from South Carolina, welcome to the program!

LINK: Hey guys.

FLATOW: Hey. Tell us how, when you take it apart, there are so many little parts in it there. The spring, for example, that comes sort of comes out first. Are they the same springs in every kind of pen?

LINK: No. For Bic pens, we make many, many different springs, depending on the requirement of the pen. It goes from maybe the lift, to the force needed to retract the mechanism, or retract the point back into the pen.

FLATOW: And what is the most important part? Everybody take your pens apart. Take your Bic pen apart if you got one.

ZYCH: Yeah, if you've got a pen at home, go for it. That's what we're all about here. So start taking your pen apart.

FLATOW: What is the most important part of the pen?

LINK: Well, that could-- I don't want to short change any of my colleagues at Bic. But one of the more important components is the ball that's in the point. The sphere that's made of tungsten carbide, very hard and dense material.

BERGQUIST: So this is right at the very tip of the point. Not the sort of cone shape, but a tiny little sphere, right in the tip.

ZYCH: Right. You have to look really close at it.

LINK: It's like one millimeter in diameter, so--

FLATOW: How hard is--

LINK: --very small.

FLATOW: How hard is it to make that point?

LINK: Well, Bic has been making pens since 1950, and very vertically integrated. We make our own balls. And there's a lot that goes into it, but one of the most important parts is having a very-- a surface that doesn't have any imperfections. If you have an imperfection, you're going to feel that when you write. It's going to be less smooth, it's going to not give you a clean line in a ballpoint pen.

BERGQUIST: So you have to make it very smooth, so that it works. Do you make your own springs?

LINK: Yeah. Yes. This is old technology, but it's done on the spring machine, and they're fascinating to watch them make springs.

ZYCH: Now I have to ask you a question, because we saw these Bic pens get submitted by our participants. There's this weird little like, white plastic thing that has a bunch of ridges on it. It's like a circular thing, it's kind of at the top, near the part that you actually click. What is that?

LINK: So that's part of the mechanism. That allows the-- when you press the button that the pen goes down, and you press it again and it retracts back up. So it's sort of like a teeth-- acts like a sewing machine, if you press it very quickly. So that it rotates around, and it matches with usually one or two other components.

BERGQUIST: So we all know the people that just sit there all day, and click. How many clicks do you build a pen for? I mean--

LINK: So we-- that's a good question. So we design our pens, we test-- put them through a series of maybe 25, 30 different torture test. And one of them is 50,000 cycles. So we designed for one of our pens to last up to 50,000 cycles.

BERGQUIST: And is the click something that you're actually going for? I mean are there--

ARIEL ZYCH: Yeah, I'm loving it.

BERGQUIST: --people that are, I want a silent pen, or-- is that something that you're building into the pen deliberately?

LINK: Well, what we found, when we did not have-- when we design a pen sometimes without that sound, we got some feedback that maybe that's not good. Because for a retractable pen, the reason you retract it is so you can put in your shirt pocket or pocket book, and you don't get ink on anything around it. So we find that users, end users, want that re-affirming click when you press the actuator-- press the button.

FLATOW: Will Link is an engineer and product manager in the stationery division of Bic International, thank you, Will, for being with us today.

LINK: Been my pleasure, guys.