

**JANET CONRAD:** I would love to try to teach physics to first- to third-graders using no equations, only using examples and only using little experiments because there is just an enormous amount that you can learn by looking at what is happening. And one of the big concerns that I have about the way physics is taught is that we love to go into all of the mathematics. And I actually think that people end up divorced from what's going on in the real world. They start to understand the mathematics really well, but they actually don't understand the physical phenomena.

And physics is a contact sport. You have to play with it, right? You will not understand angular momentum until you have been spinning around and pull your arms in and suddenly you go out of control. You know? It's those things that you have to try in order to really understand it. And I believe that we can start doing that at a very young age. And the problem, of course, is resources. You need real resources to be able to teach kids things like that. But right now, I can teach a very small child one of Maxwell's equations. I can show you how we do it.

This is the one which says that a moving magnetic field induces current and also, currents induce magnetic fields. OK? So what I have here is a very heavy piece of copper. It's actually a beam pipe from ferry lab. It's a pretty thick piece, right? And so it's copper, so current can flow through it. And I have here a magnet. And I can drop my magnet in and it takes a really long time for the magnet to fall out. And you can show this to a two-year-old and they will just watch that forever. They are so excited to see that because they know something is very seriously wrong here. And what's happening is the magnet is inducing a current, and a current is inducing a magnetic force opposite of that magnetic field. And it's preventing this thing from falling as fast as it would.

And, you know, second-graders will get this. And then when they finally get to the point where we do it with the math, then they'll really get it. So that's what I think we need to do. That's for my long-term goal.

[LAUGHS]