

Make the Connection

Recently I had a disturbing conversation with a colleague here at the office. During the conversation, it became clear to me that my co-worker—a really intelligent guy whom I respect a lot—had no idea how even the most simple electric motor works.

He said something about all the gears that must be in electric motors, and in my head, I heard that noise an old vinyl LP makes when you scratch the needle across the tracks.

“Wait a minute,” I said. “You know how an electric motor works, right?”

After all, we work at a publishing company that specializes in writing about engineered components – you know, gears, bearings, motors – that kind of thing.

I had to explain to my friend that, strictly speaking, there are no gears in an electric motor. Of course, there are such things as gearmotors, I said, but no matter how much they're integrated into one package, the gears and the motors are really separate devices.

“Didn't you ever take apart your slot cars when you were a kid?” I asked him.

When there was no reply, I followed up with, “Didn't you ever build an electric motor for a science fair project?”

You could almost hear the crickets chirping.

I can appreciate the fact that not everyone is as much of a science nerd as I am. The things that have interested me my entire life are often the same things that make other people's eyes glaze over. I guess many of you can probably relate. But I was shocked that a grown man who I consider to be an intelligent and well-rounded individual didn't know even the basics of what made a motor function.

So I took it upon myself to organize an office science project. One Friday, I went to the hardware store, picked up some wire, a few batteries and a couple of refrigerator clips with decent-sized magnets on the back. After prying the magnets off the refrigerator clips and pilfering a couple of paper clips, a magic marker and a rubber band from the supply closet, we had everything we needed.

The design is relatively simple. Bend the paper clips into shape to form an axle support that also connects to both terminals of the battery. Coil the wire (about 10 loops should do it), and wrap the loose ends around the coil to form the axle. Paint the top half of each axle with the magic marker to form a poor-man's commutator. Put it all together and hold



the coil over the magnet, and —*voila*—you've got a working electric motor.

I imagine that most of you reading this *did* take apart your slot cars when you were little, so you probably don't need any more help than what I've given above, but for those who want more detailed instructions, all you have to do is search the Internet. You'll find many examples of simple motors similar to the one I built.

After completing the project, I felt somewhat better for having shared a little bit of knowledge and a passion for science with my co-workers. But I realized all along that I was talking to the wrong audience. Sharing that knowledge and passion is something we all need to do, especially with the young people in our lives.



So I took my science project home and showed it to my 11-year-old daughter, Renee. As soon as she saw it, her response was, “Let me try!” and “Can I take it to school and

show my class?” So we're going to build a more permanent version of the simple motor, and yes, Renee, you can take it to class.

If you are interested in doing similar projects with the young people in your life, I recommend you visit the website of DiscoverE (www.discovere.org). They're the organization that sponsors Engineering Week (February 16-22). Although Engineering Week will be over by the time you read this, it's never too late to participate. They have hundreds of sample project ideas that are perfect for encouraging young minds, and most of them take no more time or effort than my simple motor.

So please find a young person and share with them your own passion for learning and exploration. I promise, you won't regret it.

Randy Stott