

## Dig Deeper: Homopolar Motor



### Materials:

- Neodymium Magnets (these have a strong force, so be careful!)
- Battery (AA or AAA, preferably)
- Copper Wire
- Pliers
- Utility knife or Scissors (to remove insulated coating of the copper wire)

### Safety:

Since the circuit will be short while the copper wire is spinning, both the copper wire and battery will get hot. Do not run your motor unsupervised or for more than 3 minutes at a time.

### Steps for Homopolar Motor Fan (<https://www.youtube.com/watch?v=RGFtpOZxThc>):

1. Stand the battery upright.
2. Put the neodymium magnet on one end of the battery (it should magnetically attach on to the end).
3. Take your copper wire, and create a spiral opening/wrap around at the other end of the wire. Make sure that it is slightly bigger than the end of the battery.
4. Make sure to bend the other end of the copper wire, so that it points downwards.
5. You will need to put the copper opening on top and through the battery, so that it can cover the magnet on the negative end. In addition, the bent end of the copper wire should touch the side of the battery that does NOT have the magnet attached to it.
6. Observe what happens and record your observations!

Questions:

1. What happens when you put the magnet on the negative side of the battery? What about the positive side? Why do you think that is?
2. Why do we need to completely cover the magnet with our copper wire? Would the wire still move if we did not?
3. Is the Law of Conservation of Energy being applied here? If so, what energy source(s) are involved in this motor?
4. Can ANY metal work for our wire? Why or why not?
5. Going back to the previous experiment, could we make a Homopolar Motor with a potato battery? Why or why not?

**Another Analogy:**

Using the information about voltage, current, and resistance we've given you so far, try and find a way to relate these three components using a different analogy that you like or that makes the most sense for you and share it with us on the Facebook Page or via email, [tHSTEM@uh.edu](mailto:tHSTEM@uh.edu)!

Reminder: Do not use any of the analogies that were already used in the lesson and make sure it is school appropriate.

Lastly, be creative! We look forward to reading what analogies resonated with y'all!