

Motor Lab Teachers Guide:

While we have done our best to guide you through every step of the experiment, we suggest you try to follow the guide by yourself to see which points your students might need clarification on, as well to get a sense of which parts of the experiment are more difficult.

Different types of batteries will yield various results from the motor. Also, several adjustments to the motor may need to be made in order to have a high-quality, consistent spinning. These adjustments may include but are not limited to:

- Bending/straightening of the paper clip
- Changing the batteries
- Adjusting the height of the safety pins
- Adding additional batteries to increase the strength of the magnet

Laboratory Answer Sheet:

1. One way to make the coil spin the other way would be to reverse the battery leads, so that the current from the battery flows in the opposite direction (and as a result applying a force in the opposite direction). A second way would be to flip the magnets around, so that the poles are reversed (and again, the result is a force in the opposite direction). If both of these things are done, the coil will spin in the same direction as originally, because the force is identical to the force before.
2. The force placed on the coil can get it to spin about a half a turn – when it gets to that position, the force on it is reversed, making it spin in the opposite direction. If it wasn't for the enamel preventing the electric flow in the wire at the half-turn position, the coil would indeed reverse its spin and either spin back and forth in half-turn rotations, or simply get stuck (at an equilibrium force). The enamel prevents the electricity from flowing when it reaches the half-turn position, allowing the momentum of the turning wire to carry it over to the full rotation, so that it can continue spinning in the same direction.
3. There are a few valid options including, increasing the strength of the batteries (thus increasing the current in the wire), increasing the strength of the magnets (thus increasing the force acting on the wire), and bringing the wire loop closer to the magnet (thus exposing it to more of the magnetic field).
4. Making sure that the wire is straight is important because it makes the turning easier. If the wire is bent, it is harder to bring the bent down portion upwards than it would if the wire was straight.
5. Bringing the wire closer to the magnet is explained in #3.