

How to Build a Simple Motor

Follow the instructions to build a simple motor.

Materials:

- 1 D cell battery
- 1 D cell battery holder
- 2 Safety pins, large
- 1 Rubber band
- 1 1¼-inch donut magnets
- 45-60 cm 20 gauge insulated magnet wire
- 1 sheet Sandpaper
- 1 pencil

- ➊ Starting approximately 8.5 cm from one end of the wire, wind the wire tightly around the pencil, making a circular shape. Make sure as you wind that the loops are close together. Stop winding the wire when you have approximately 8.5 cm of wire left. (The arms on each side of the coil should be the same length.)
- ➋ Carefully slide the shape off of the pencil and wrap the ends through the circle on either side to hold the coils together.
- ➌ Straighten the long pieces of wire sticking out so they form arms coming from the center of the circle.
- ➍ Use the sandpaper to carefully sand the insulation off of one side of each of the arms.
- ➎ Place the battery in the holder. Place the rubber band around both terminals so it encircles the entire holder.
- ➏ Slide a large safety pin between the rubber band and the terminal on each side, with the larger part of the pin making contact with the terminal.
- ➐ Slide the arms of the coil into the holes on both of the safety pins.
- ➑ Place the magnet on top of the D cell battery directly beneath the coil. The coil should begin to rock back and forth. Give the coil a gentle push to start the rotation.

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How to Build a Simple Motor, continued

Here are some tips for getting the simple motors to work. The motor may have to be tinkered with to make it work properly. If you are having difficulty getting the coil to rotate or it is not rotating well, try the following:

- Is the charge of the battery sufficient for the size of your coil? Try adding a second battery or pairing down the size of the coil.
- Are all of the connections good?
- Check the insulation on the arms of the coil. Has all of the insulation been removed from half of the wire on the same side? If this was not done properly, the current will not flow properly and an electromagnet will not form.
- Check the distance from the bottom edge of the coil to the permanent magnet. It should be less than 1/8th of an inch; adjust as necessary.
- Make sure the coil is centered over the permanent magnet.
- Be careful – the safety pins will become hot when attached to the battery's terminals!