

HOMOPOLAR MOTOR

With just a few materials, you can build a homopolar motor and explore how electrical energy turns into spinning motion!

INSTRUCTIONS

STEP 1: Use the needle-nose pliers to bend the copper wire into a loop or other fun shape, such as a heart or spiral.

STEP 2: Place the neodymium disc magnet on a flat surface.

Attach the negative end (or bottom of the battery) to the magnet. The magnet should stick securely to the battery.

STEP 3: Hold the battery upright with the magnet at the bottom. Carefully place the copper wire over the positive terminal of the battery (the positive end of the battery) so the wire balances on top and its ends touch the side of the magnet.

STEP 4: Use your observations sheet to record what you see.

THE SCIENCE

When you connect the copper wire to both the battery and the magnet, electricity flows through the wire. The battery provides the electricity, and the magnet creates an invisible magnetic field.

The electricity in the wire and the magnetic field work together to create a special force called the Lorentz force. This force pushes the wire and makes it spin around the magnet.

The wire keeps spinning because the force keeps pushing it in the same direction as long as the electricity is flowing. The motor will keep working as long as the wire stays connected to the battery and the magnet.

SUPPLIES

AA battery
Neodymium magnet
16 gauge Copper wire
Needle-nose pliers
Wire Cutters
A flat surface

Hompolar Motor Observations

Use this worksheet to process and evaluate your work.

What do you predict will happen when the wire touches both the battery and the magnet?

What do you observe when the wire touches both the top of the battery and the magnet at the bottom?

How does the wire move? Is the motion smooth or jerky?

Does the speed of the spinning wire change over time?

What do you think causes the wire to spin?

