

Application No. 49: One Loop Motor in 3 Pieces

Author: Duijnstee, Rotterdam, Netherlands

Wire, magnet, battery - and the motor is ready

Maarten Duijnstee, Physics Professor from Rotterdam, sent us an instructional experiment with a very simple electromagnetic motor and writes:

The one loop motor is one of my favourite SuperMagnet-experiments.

One requires

- a S-15-08-N (www.supermagnete.nl/eng/S-15-08-N) Supermagnet
- a normal AA-battery
- a piece of copper wire with 1 mm diameter, 30 cm long for the loop
- a small bowl with approximately 1 cm of water (optional)

The copper wire can be made from a normal electrical cable with the isolation removed.

Cut a piece of wire 30 cm long.

First form the circular portion of the wire loop by wrapping the wire around the magnet. One-and-a-half turns are enough. You can also use the battery to form the circular portion but you must be careful not to wrap too tightly or the loop won't fit over the somewhat larger magnet.

Form the remainder of the wire into the shape shown in the photo: allow the loop to run out into two parallel ends. Then bend the two vertical pieces towards each other and form the loop spike, onto which the battery will be placed, as shown. The dimensions of the finished loop: 6 cm tall, 4,5 cm wide.

Place the magnet on the negative pole of the battery. If necessary you can make a small dent in the positive pole of the battery so that the spike can be better centered on it.



The finished loop and battery with the magnet

The circular part of the wire form must be able to move without hindrance around the magnet but must nevertheless stay in contact with it in order to close the electrical circuit.

If necessary to ensure contact, place the whole system into the bowl of water.



Video, 330 kB

The one loop motor is a nice experiment to demonstrate the so-called Lorentz force (en.wikipedia.org/wiki/Lorentz_Force). This occurs when an electrically charged conductor is placed in a magnetic field. The direction in which the motor turns indicates where the north and south poles of the magnet are to be found.

Articles used

1 x S-15-08-N (www.supermagnete.nl/eng/S-15-08-N)

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