

5.3. Oersted's experiment – horizontal version

Aim: to investigate that an electric current produces a magnetic field.

Apparatus: from the Low-Tech kit you will need:

- brass wire,
- 4.5 V battery,
- 2 compasses,
- 4 crocodiles,
- 2 cables,
- plexi table with short legs.

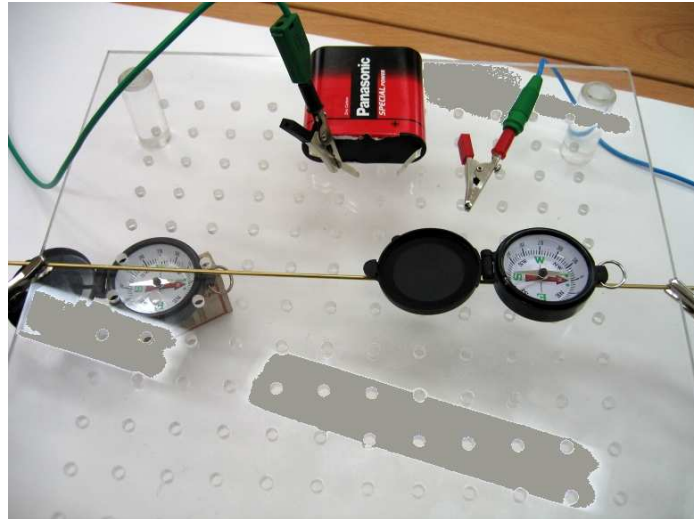


Photo 1. The set-up for presentation horizontal version of Oersted's experiment.

Procedure:

Put brass wire on the plexi table with short legs. Place two compasses around a straight brass wire (above and under – put on match box). Connect the brass wire through 2 cables and 4 crocodiles to 4.5 V battery.

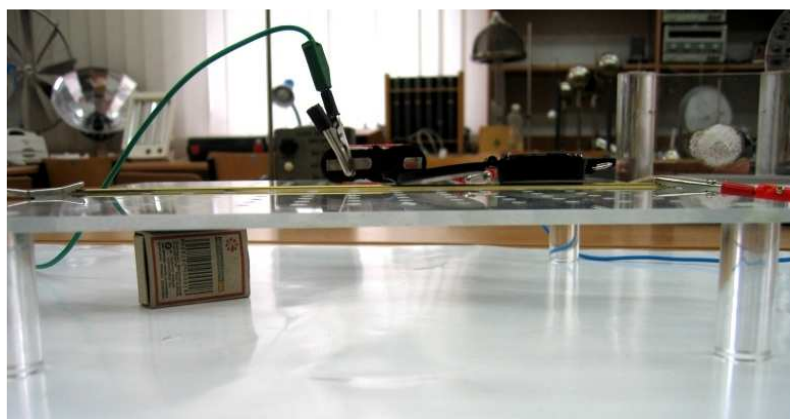


Photo 2. The way of connection of all experimental elements.

Explanation:

We place two compasses right above and right below a horizontal straight wire, which is part of an electrical circuit. The straight wire is parallel to the north-south direction, as are the compass needles. Touch two crocodiles to 4.5 V battery and close the

electrical circuit. What happens? Watch the compass needles. Please reverse the direction of the current. What is the explanation?

The needle of the compass turns until it sits in an orthogonal direction with respect to the brass wire. The direction indicated by the needle is the opposite for the compasses placed beneath the wire, with respect to those placed above the wire. If we reverse direction of the current in the wire the orientation of the needles is reversed in the compasses placed above and below the wire. In 1820 Oersted showed that electric current could be a source of a magnetic field. The magnetic field produced by a current extends above and below the cable. The direction of this is fixed when the direction of the current is fixed.