

Figures and Captions

Figure 1: Romagnosi's Experiment

Credit: Contemporary drawing by Gilberto Govi, 1869.

Figure 2A: Magnetic Field around a Bar Magnet

Demonstrating the orientation of the magnetic field surrounding a bar magnet.

Figure 2B: Magnetic Field around an AA Carbon-Zinc Cell

The compass spacing is reduced because the magnetic field strength is much weaker, yet the compass needles still deviate from magnetic north albeit they appear "uncertain".

Figure 2C: Magnetic Field around an Alkaline AA Cell

The Duracell brand produced the strongest and most reliable deviations in the compass needles similar to those caused by the bar magnet.

Figure 3A: Tangent Law of Magnetism Demonstration Using AA cell

The compass (orientated to magnetic north beforehand) needle is deflected to 45 degrees at a distance of 33 millimetres from the compass' centerline by the alkaline cell's static magnetic field (possibly). At this angle, both magnetic field strengths are equal or about $55.7 \mu\text{T}$, which is the Earth's magnetic field strength at my location. See <https://www.magnetic-declination.com>.

Figure 3B: Tangent Law of Magnetism Demonstration Using Bar Magnet

The bar magnet was able to easily deflect the compass needle by 45 degrees at a distance of 174 millimetres, over five times farther away than the AA cell.

Additional References

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