

Introduction to Electromagnetism Worksheet

Observations

Part I. Magnetism produced by a current-carrying wire

Initial direction of the red tip of the compass needle.

Effect of the magnet on the compass needle.

Direction of the red tip of the compass needle with electric current traveling through the wire. What happens when the current is reversed?

Effect on the compass needle by the horizontal current-carrying wire. What happens when the current is reversed?

Part II. Building an Electromagnet

Number of paper clips picked up by the electromagnet (with iron core):

Effect on the compass needle.

Number of paper clips picked up by the coil of wire (without iron core):

Effect on the compass needle.

Introduction to Electromagnetism Worksheet (Con't.)

Part III. Electromagnetic Induction

Observed deflection of the compass needle. What movement produces the strongest deflection?

Post-Lab Questions

1. Since the compass needle is deflected by a magnetic field (the neodymium magnet), what does it mean when an electric current deflects a compass needle?
2. When the electric current is traveling through the vertical wire, does the compass needle ever point towards the wire?
3. Based on your observations, what is the general shape of the magnetic field surrounding a current-carrying wire?
4. What direction does the compass needle deflect when a horizontal current passes over the compass? What direction does the needle point when the current is reversed?
5. Compare the strength of the electromagnet with the iron nail core to the one without. Why would an iron core have this effect?
6. The 60-mL jar with the coiled wire and compass inside is a simple galvanometer, or a device that detects very small currents. What property of electric current does this simple galvanometer detect?
7. The bottle preform with coiled wire and moving magnet is a simple solenoid. When the magnet moves through the solenoid, a current is produced in the coiled wire which is then detected by the galvanometer. Based on your observations, what type of magnet motion produced the most current (the largest deflection of the compass needle)?