

3.16.2.2: Magnetic Field Simulation

In this simulation you examine the magnetic field of either a permanent magnet or the field produced by a flow of current in a coil. Field is measured in gauss. The compass, magnet and coil are all draggable. The earth's magnetic field can also be demonstrated.

Simulation Questions:

1. First leave the magnet stationary and move the compass around by dragging it at its center. Which end of the compass points towards the north pole of the magnet? What happens at the south pole of the magnet?
2. Describe the magnetic field around the magnet. What happens to the field strength as you get further away? What happens near the middle of the magnet?
3. Reset the simulation. Now leave the compass stationary and move the magnet around. Describe the behavior of the compass needle. Is your description of the magnetic field different from the case of moving the compass? Explain.
4. Click the 'Earth' radio button. What do you notice about the magnetic field of the earth? Is the geographic north different from the magnetic north? Explain.
5. Reset the simulation and click the 'coil' radio button. Leave the coil stationary and move the compass around. How does the magnetic field of the coil compare to the magnetic field of the bar?
6. Now try different currents in the coil using the slider. What happens when the current is zero? Explain what happens when the current is negative (which means it flows in the opposite direction).

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