Mini-Lab: Magnetic Force on Current

1. Goal: Demonstrate and analyze the force resulting from a current carrying wire immersed in a magnetic field.
2. Use tape to hang the rectangular coil from a support – a little bit like a playground swing. Use jumper cables to connect the coil to the battery – only for very brief intervals (complete the circuit by a brief touch of the cable to the terminal).
3. Hold the permanent magnet in various positions and observe the effect on the coil when current flows.
4. Verify the right hand rule for this phenomenon: force, current (conventional), and field go with fingers, “flip”, and thumb in what order?

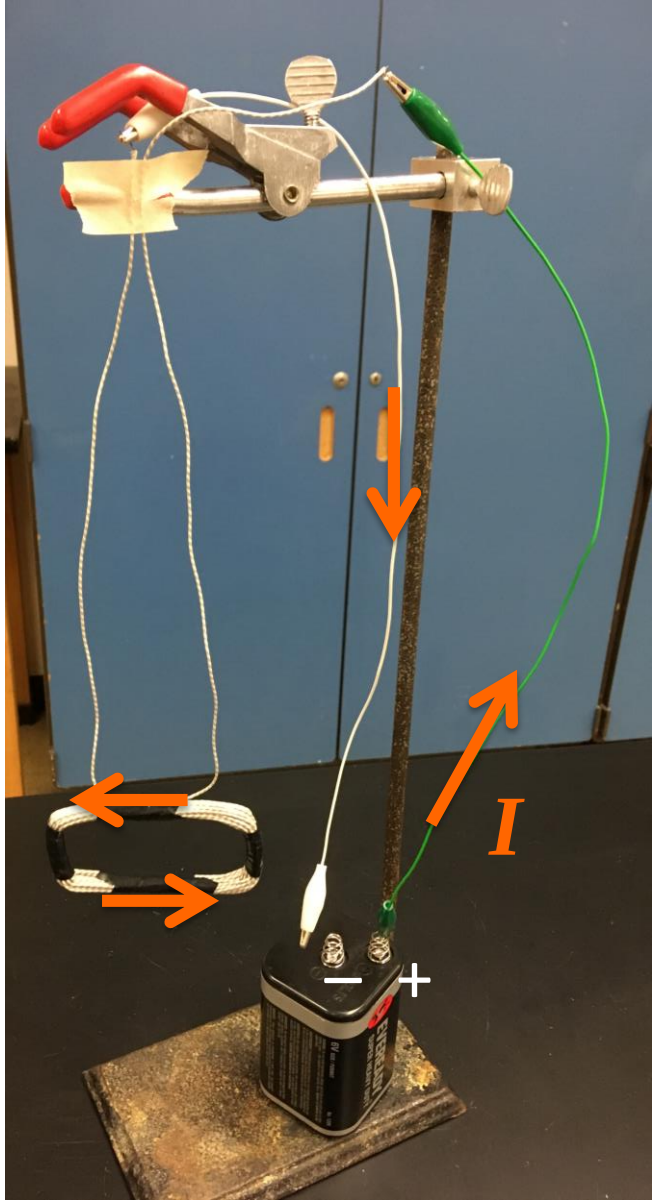
Lab Setup:

Be gentle with wires.

Careful not to short circuit against metal supports.

Need to be able to tell the direction of the current!

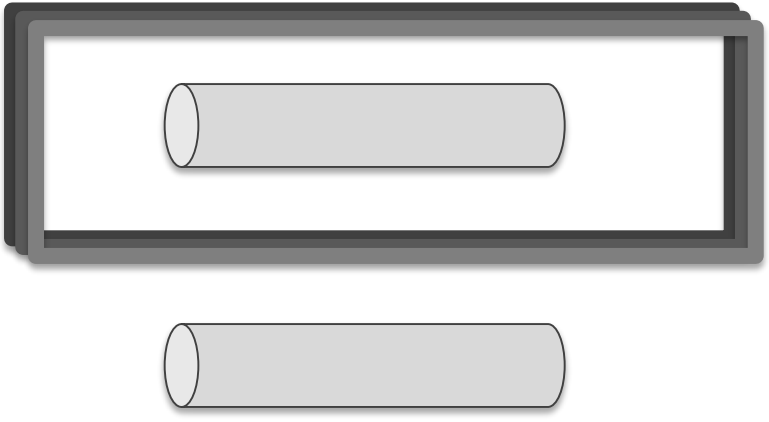
Do not leave connected – it will drain the battery!



Magnet in same plane as coil: side view

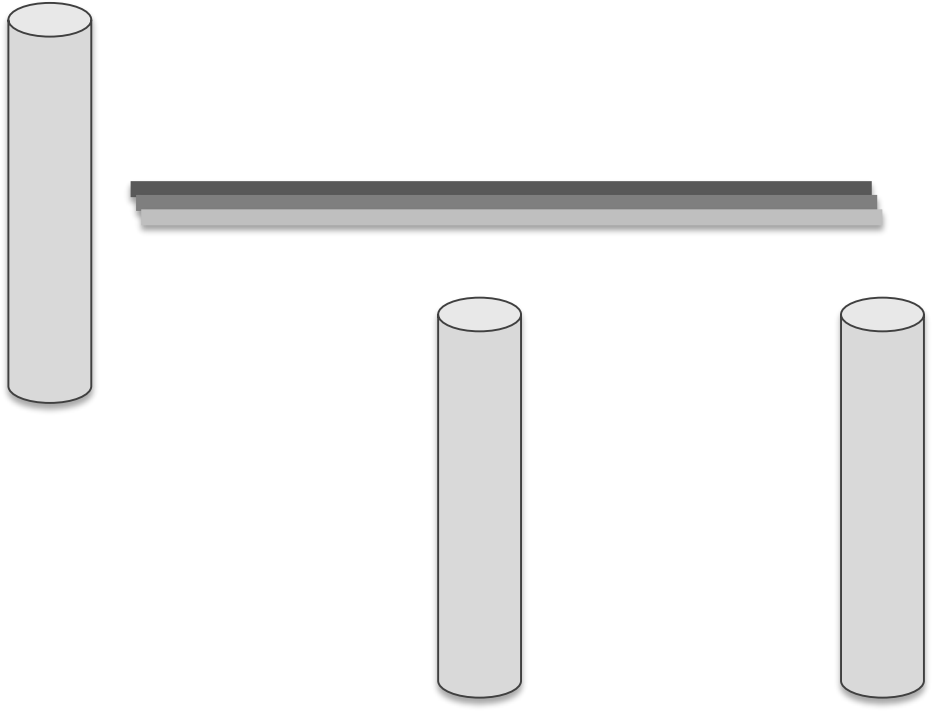
By observing force on side of coil nearest magnet figure out the right hand rule: directions of *F*, *I*, and *B*.

Magnet in same plane as coil: side view



Observe torque on the coil and compare to direction of field through the coil's plane.

Magnet perpendicular to plane of coil: top view



The coil acts like a magnet – where are its poles?

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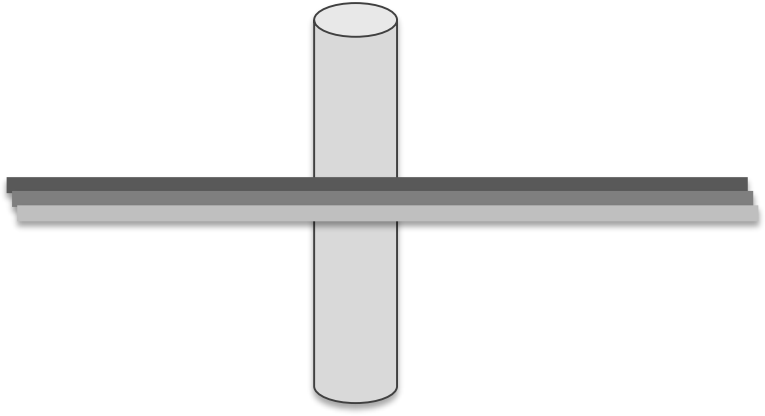

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