

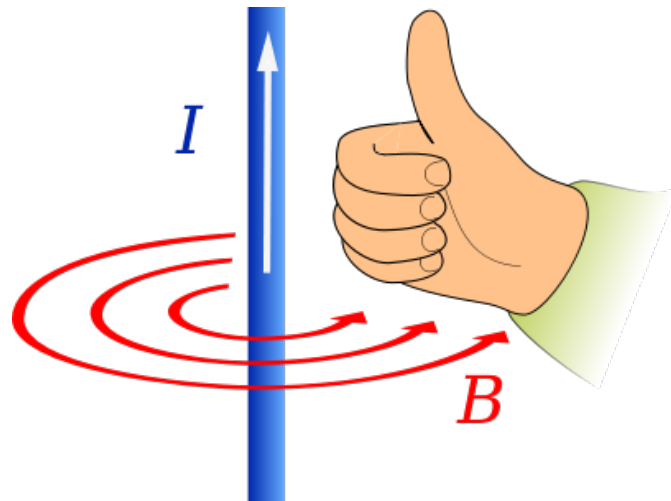
Speakers Lab

CA Science Standards Addressed:

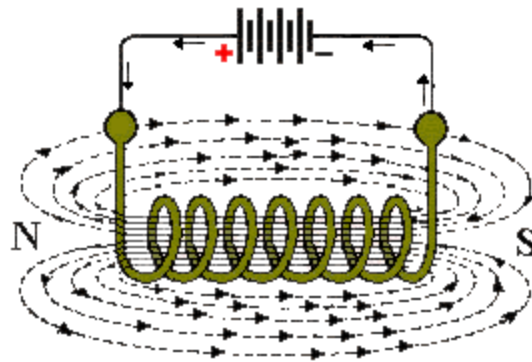
Physics 4a,4b,5f,5h

Introduction:

André-Marie Ampère, a French physicist, discovered that magnetic fields are created when electricity runs through a copper wire. How we can predict the direction of the magnetic field can be remembered through what we call “the Right-hand Rule”.



If we were to wrap a straight wire into a coil (spiral), we see that the magnetic fields overlap in a small area in the center of the coil. So, one can increase the magnetic field by either increasing the current to a coil with a certain number of turns or alternatively, increasing the number of turns in the coil while keeping the current the same.



Abstract:

By sending electrical current through a wire, can we generate a magnetic field? What happens to this magnetic field when we coil the wire and keep the current the same? What happens when we place a magnet in the middle of the coil when there is a current (magnetic field) present in the coil?

Materials:

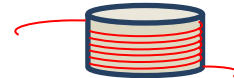
- 1) Paper Plates or Cups
- 2) Index Card
- 3) Rare Earth Magnetics or Neodymium Magnets
- 4) Masking Tape
- 5) Audio source
- 6) Audio Amplifier
- 7) 8ft of Magnet wire.

Procedure:

- 1) Cut template out. You should have three 1" by 6" strips.
- 2) Wrap one of the paper strips to create a tight ring around the magnet. Tape in place.
- 3) Repeat paper strips two more times. You should have to 3 paper rings around the magnets.



- 4) Scrap off 1inch of enamel (using scissors) off of the magnet wire from both ends.
- 5) Take magnet wire and coil around the paper rings VERY tightly. Do not overlap until at least half of the paper ring is covered.
- 6) Tape magnet wire onto paper coil carefully.

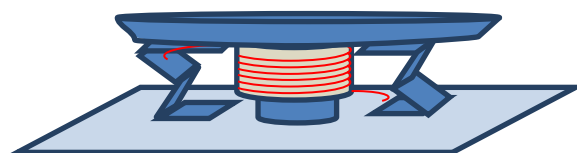


- 7) Remove magnet from center. Remove TWO inner paper rings. Only one should be left.

- 8) Tape magnet stack onto table.
- 9) Cut index card in half lengthwise. (Hot-Dog Style)
- 10) Fold each piece of index card to look like an M.
- 11) Tape one end of each index card piece on table next to magnet.



- 12) Securely tape paper ring and wire onto bottom of plate/cup.
- 13) Tape other ends of M index cards to plate. Paper ring and wire coils should fit loosely around magnets.
- 14) Bring speaker up to instructor to test.



Data:

Number of magnets used: _____

Number of coils made: _____

Analysis:

- 1) Does the speaker move up and down?
Answer: _____

- 2) What does the paper plate/cup serve to do?
Answer: _____

- 3) What would happen if more magnets are added?
Answer: _____

- 4) What would happen if no magnets were present?
Answer: _____

- 5) Explain how the speaker is creating waves that reach your ear.
Answer: _____

- 6) How times did coil your wire? What would happen if more coils were added?
Answer: _____

- 7) What would happen if there were only 2 coils? What would have to happen to make the speaker sound the same if only 2 coils were available?
Answer: _____

Name: _____

Period: _____

Conclusion:
