

Physics 135B Activity ⁹

Faraday's Law of Induction and Lenz's Law:

Faraday's law of induction:

$$\mathcal{E} = -N \frac{\Delta\Phi}{\Delta t}, \text{ where } \Phi = BA \cos \theta$$

The inclusion of the negative sign is called the Lenz's law which states that a loop circuit will oppose any change in magnetic flux imposed on the loop through its cross-section by creating its own magnetic field—by inducing a current—to counterbalance the change.

Finding the North and South Poles of a magnet using a Compass

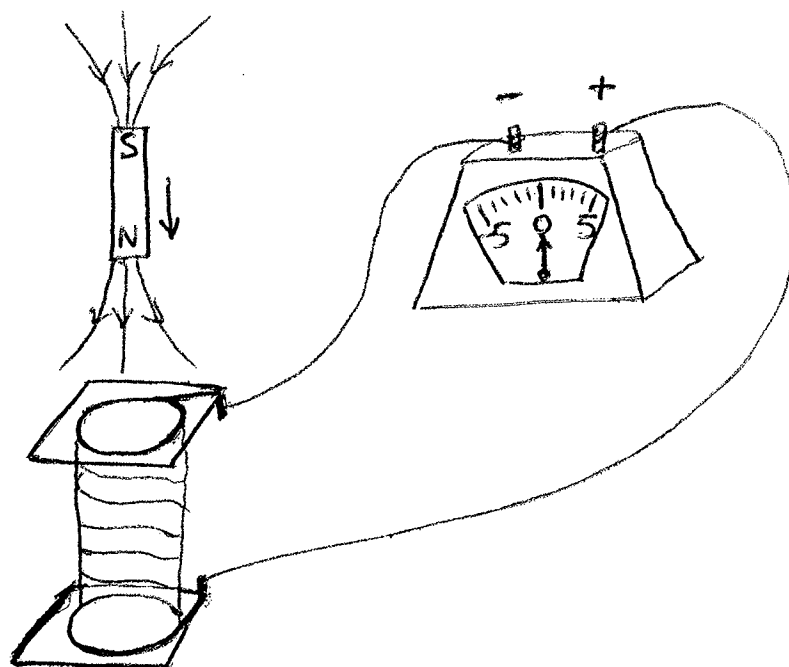
Using the compass provided to you, determine the north and south poles of the little magnet you are given. Label the north end with a little piece of post-it tape.

The red tip of the compass is its north pole!

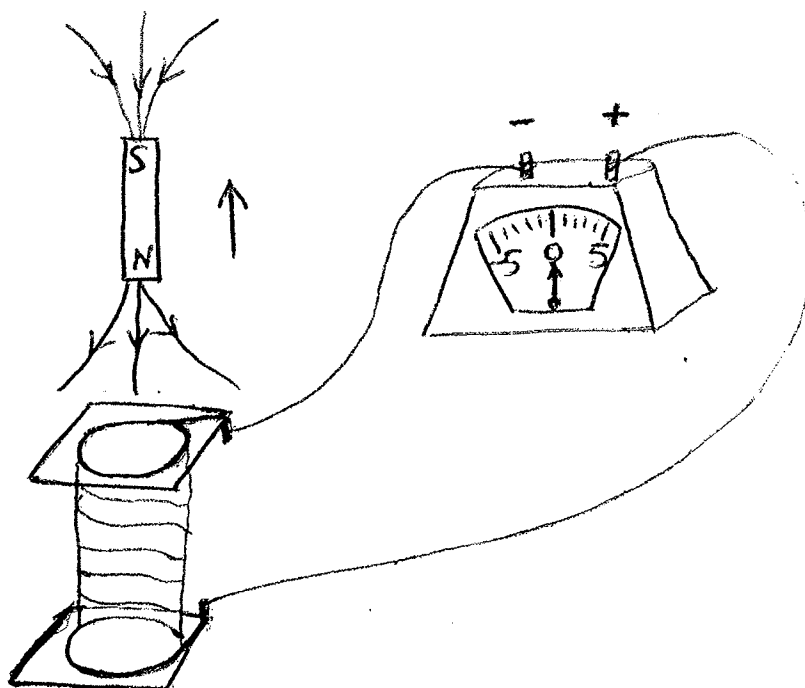
Faraday's Law of Induction and Lenz's Law:

Indicate which way the induced current will flow in the following set-ups (CW or CCW).

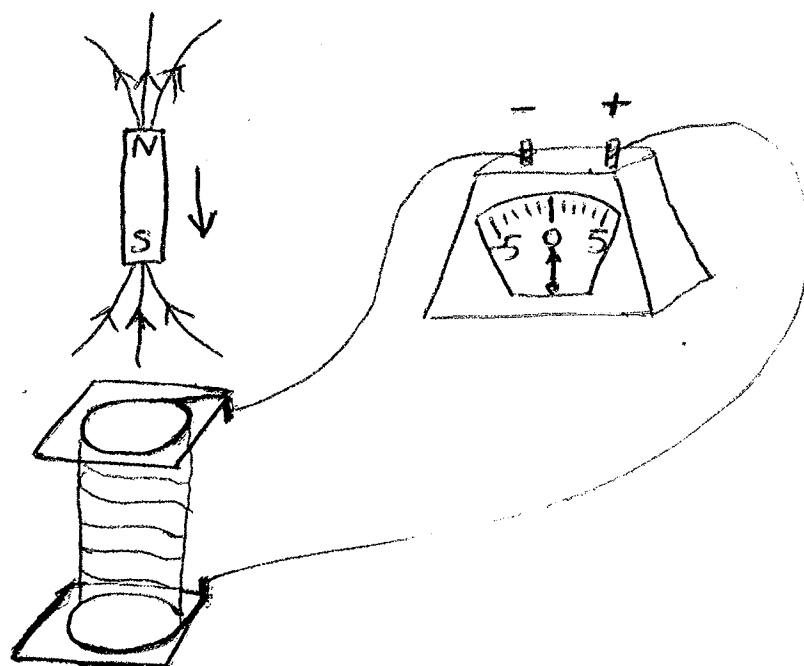
1-



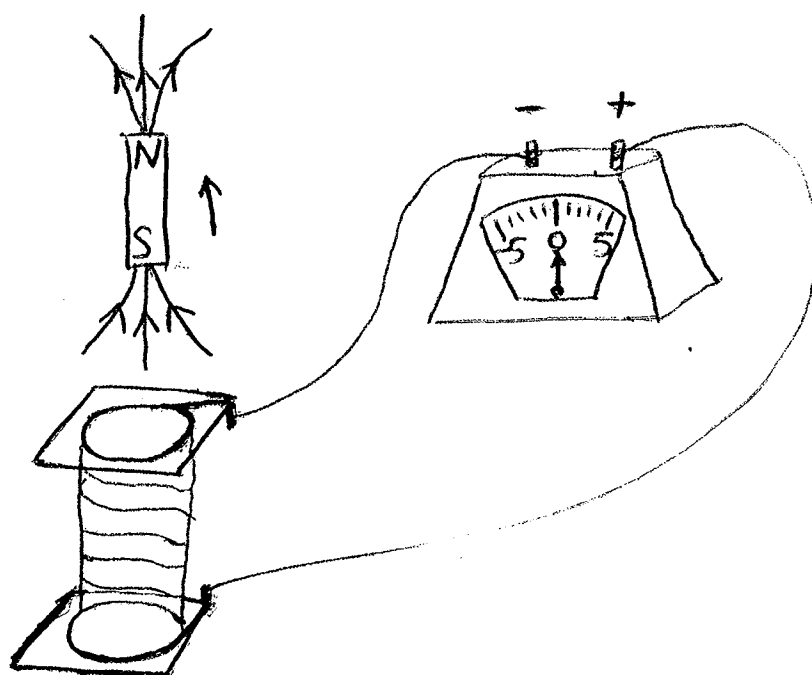
2-



3-



4-



Observing the Faraday's Law of Induction:

You will find a galvanometer (a sensitive ammeter, measures small currents) hooked up to a wire loop (solenoid). Now try experimentally each of the above four scenarios!!

PLEASE NOTE: Positive reading of the galvanometer indicates CCW flow (looking at the solenoid from top). Negative reading indicates CW flow.

Indicate below what you observed, and state whether it is in accord with what you predicted above: your answers should be something like "CW as predicted," or "CCW, wrong prediction." If your prediction was wrong, go back and reflect on your reasoning and try to correct it, and write below how you corrected your prediction. What your mistake was etc...

1-

2-

3-

4-

Conclusion: What is your conclusion about this activity? Briefly explain.