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Lab 08 - Faraday's Law Simulation

1. Open the Faraday Law simulation and discover what you can about induction. Make a list of ways to cause induction.
   Moving the magnet through the coil & changing the orientation of the magnet

2. What made you think that induction had occurred?
   The lightbulb lit up, indicating the change in voltage as a result of the movement of the magnet through the coil.

3. Open Faraday's Electromagnet Lab. Investigate using the window called Pickup Coil. See if you can discover more things that effect induction and add them to your list.
   Area of the coil & strength of the magnet

4. In this simulation, there is another way to show that induction is happening. Explain why this method may not have been used in the simpler simulation.
   The voltmeter indicator isn't as effective as the lightbulb because the results aren't as apparent as the bulb lighting up since the needle moves very rapidly and, depending on the range of movement, very little distance, therefore making it more difficult to see the effect.

5. Describe in your own words what induction means.
   Changing the charge of an object without making physical contact with it.

6. Write a comparative paragraph to meet the third learning goal. Make sure to consider the strengths and weaknesses of each as an indicator of current.
   The lightbulb and voltmeter are both tools that are able to indicate the change in the current passing through the coil as a result of manipulating certain elements of the setup. When using the lightbulb as an indicator, moving the magnet or changing its strength will generate a current through the loop of wire which is evident through the way the lightbulb lights up under those circumstances. Similarly, the voltmeter indicates the status of current through the loop by measuring the voltage across the loop. While both methods indicate the magnitude of the current (brightness level for lightbulb and magnitude of voltage for voltmeter), the voltmeter differs as it is able to determine the type of charge (positive or negative) due to the direction the magnet moves.

7. Design an experiment to determine how the size and direction of the induced current will change when the conditions are varied. Collect data, make observations and record your information in a table.
   - Set up loop of wire with a consistent surface area and connect it to the voltmeter
   - Part 1: move the magnet through the loop at varying speeds in the same direction and record the results. Repeat at least 5 times

- Part 2: move the magnet through the loop at the same speed but in different directions and record the results. Repeat twice for each direction.
- Compare the magnitude of the voltage recorded for each trial

8. Write a summary that demonstrates that you can meet the first two learning goals. Through the use of magnets and a loop of wire connected to a lightbulb or voltmeter, one is able to determine the presence of current in the wire as a result of manipulating variables such as position or orientation of the magnet. Furthermore, it is possible to alter the magnitude of the current produced by either increasing the area of the coil or the strength of the magnet.