Faraday's Law

Open the PhET Simulation: https://phet.colorado.edu/en/simulation/faradays-law

NOTE: TYPE ANSWERS BELOW IN RED

OBJECTIVE:

- Explore various aspects of Faraday's Law using magnets and coils.

DIRECTIONS:

1. **1.** After opening the simulation, click on "Field Lines" to see the magnetic field around the magnet. Draw a sketch of what you notice.

   The field lines seem to circle around the magnet. The arrows go from the North Pole and circle to the South Pole on both sides of the magnet. The radius of the field lines also vary in size. The ones farther away from the magnet are way bigger than the ones closer.

1. **2.** What happens as you move the north end of the magnet into the coil?

   The voltage becomes negative and the light bulb starts to glow a little. The farther the magnet moves into the coil the brighter the bulb gets.

1. **3.** How does the Voltage change as you move the south end of the magnet into the coil rather than the north end?
2. The voltage becomes positive when you move the south end of the magnet towards the coil.

1. **4.** What happens if you move the magnet into the coil very slowly versus

very quickly? What relationship can you make between the motion of the magnet and the current produced?

If the magnet moves slowly the bulb only glows dimly. If you move the bulb very fast then the bulb glows brightly. Faster motions lead to more current.

1. **5.** Can you produce a current when the magnet moves up and down in the loops (while not moving toward or away)?

   A current can be produced when the magnet moves up and down.

1. **6.** Next try two rings versus four rings. What relationship can you make between the number of loops and the current produced.

   The more loops there are the more current that is produced.

1. **7.** Lastly, try putting the magnet in the loops and click the magnet flip button. What happens as you spin the magnet several times?

   The voltage changes directions every time the magnet is flipped and the bulb flashes very time the magnet is flipped.

1. **8.** Look at the Voltage needle as you spin it multiple times. What type of current do you think it is producing? AC or DC?
2. The current that is being produced is alternating current since the flow of the current can go backwards and forwards.