NAME: DATE: Period:

Introduction:

This lab activity utilizes simulations to examine the important parameters in the design of an electrical generator. The terminology of motors and generators is developed, and the equation for a simple generator is presented in terms of the generator parameters.

Vocabulary:
armature, coil, frequency, angular frequency, commutator, amplitude, flux, waveform, brush

Procedure:
Part A:
Run the simulator at PHET - http://phet.colorado.edu/sims/html/faradays-law/latest/faradays-law_en.html

Pass the magnet through the coil. What happens?

Why does this not occur when the magnet is not moving?

Pass the magnet through faster and repeatedly. What happens differently?

Change to two coils. What is the difference between the two? What is the different outcome?

What type of circuit would allow you to have two coils?

Put the magnet in the coil. Now reverse the polarity. Why does this happen?

Turn on the Field lines. How does this help demonstrate what is occurring?

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Part B:

Rotating Magnet Armature

1. Open the simulation “Faraday’s Electromagnetic Lab", and select the generator tab. Set controls similar to those in the diagram at the right.
http://phet.colorado.edu/en/simulation/faraday

2. Investigate how (or if) the variables below affect the size of the voltage induced in the coil. The coil and rotating magnet represent a generator design.

3. Summarize your observations when you change the properties of these items:

- Number of turns in the coil

- Strength of the magnet

- Speed (frequency) at which the magnet rotates

- Is the output AC or DC?

- Area of the coil

- Orientation of the magnet and sign of the induced voltage

Open the other simulators and play with them. Tell me:

How does a transformer work?

Why does the compass needle move?