Induction Intro Concept Questions:

1. (using the simplest way you can) describe how to create electric current using a permanent magnet.

2. Describe what Magnetic Flux is

3. What is the formula for Magnetic Flux?

4. What are the units for Magnetic Flux?

5. Describe how to create an EMF in terms of Magnetic Flux (think about the equation we use).

6. What does the following symbol indicate in our Electromagnetic Induction Unit – "Φ"

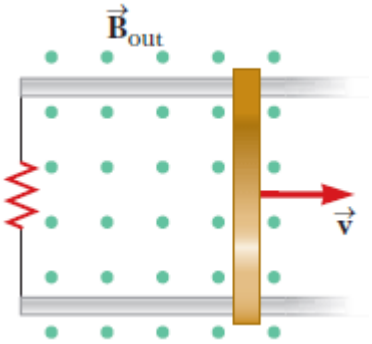
7. What does $\frac{\Delta \Phi}{\Delta t}$ in this unit mean?

8. What is the equation used to find the EMF (voltage) generated by moving a conductor through a magnetic field.

9. Describe what lenz's law states.

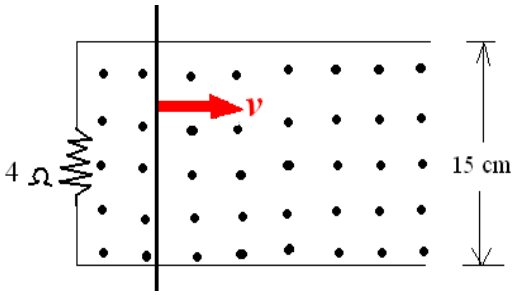
Examples:

Conductors moving through a magnetic field.



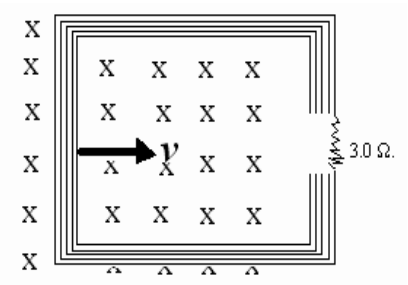
Example 1) A conducting rod 25.0 cm long moves perpendicular to a magnetic field, B = 0.20 T at a speed of 1.0 m/s. Calculate the induced voltage in the rod? And the direction of current flow

Example 2) The conducting rod in the diagram below is 15 cm long, and is moving at a speed of 2.0 m/s perpendicular to a 0.30 T magnetic field. If the resistance in the circuit is 4.0 Ω, what is the magnitude and direction of the current (electron flow) through the circuit?

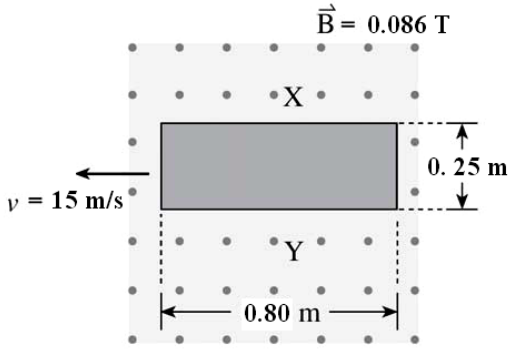


Example 3) A rectangular coil of wire containing 5 loops is moved at a speed of 4.5 m/s perpendicular to a 0.85 T magnetic field as shown below. If the length of the side of the coil moving perpendicular to the field is 0.28 m and the resistance in the circuit is 3.0 Ω.

a) What is the induced current?
b) What is the direction of the current (electron flow)?



Example 4) A solid conductor travels 15 m/s across a uniform 0.086 T magnetic field. Which side (X or Y) is positively charged and what is the ***emf*** across this conductor?



Example 5) A 600 turn circular coil with an area of 2.64 x 10^{-2} m^2 is perpendicular to a 0.08 T field. The magnetic field changes to 0.01 T in the opposite direction in 0.25s.