What the Flux (Φ)

Flux (Φ), is the magnetic field lines. This is a necessary component in inducing current. It is the change in the flux that causes current. If the magnet does not move, the field lines do not move, electrons do not move - no current.

$$\Phi = \vec{B} A \cos(\theta)$$

$$\varepsilon = -N \frac{\Delta \Phi}{\Delta t}$$

This is Faraday's Law of Magnetic Induction

Lentz's Law explains the negative sign:

The polarity of the induced emf will always be such that it will produce a current whose magnetic field opposes the changing flux that produced the emf.

Let's try an example:

I put a loop of wire (r=20cm) in a magnetic field (.5T). Assume that the axis is perpendicular. What is the electromotive force (emf)?

What if I pulled the loop of wire out in .25s?

Hint:-.25V

Practice Problems: page 100π.