

Faraday's Law:

$$emf = \oint \vec{E} \cdot d\vec{\ell} = -\frac{d\Phi_B}{dt}$$

where

$$\Phi_B \equiv \int \vec{B} \cdot d\vec{A}$$

In Practical Words:

- 1) When the flux  $\Phi_B$  through a loop changes, an *emf* is induced in the loop.
- 2) The *emf* will make a current flow if it can (like a battery).
- 3) The current that flows induces a new magnetic field.
- 4) The new magnetic field opposes the change in the original magnetic field that created it. (Lenz' Law)

