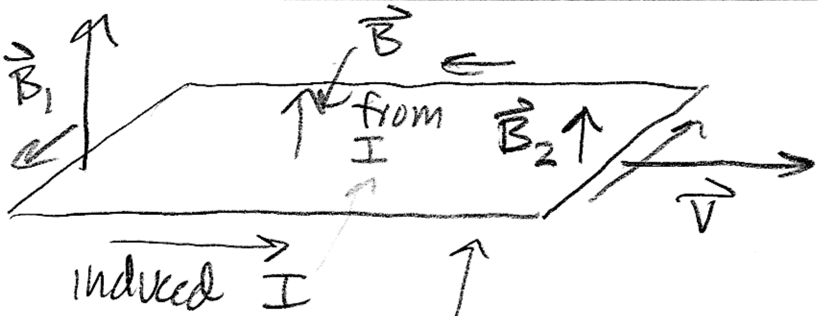
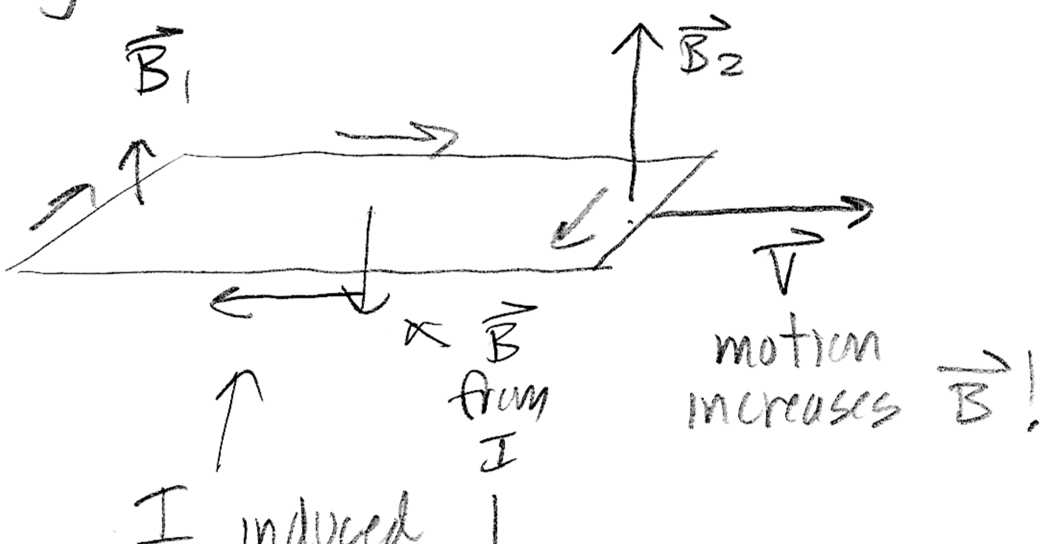
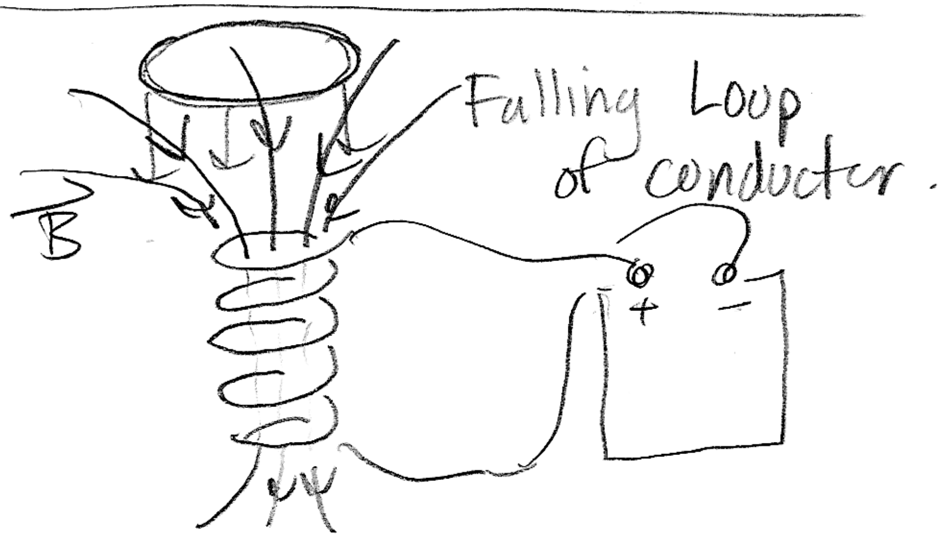


motion tending to decrease field, current will flow in direction to get more $\vec{B}$

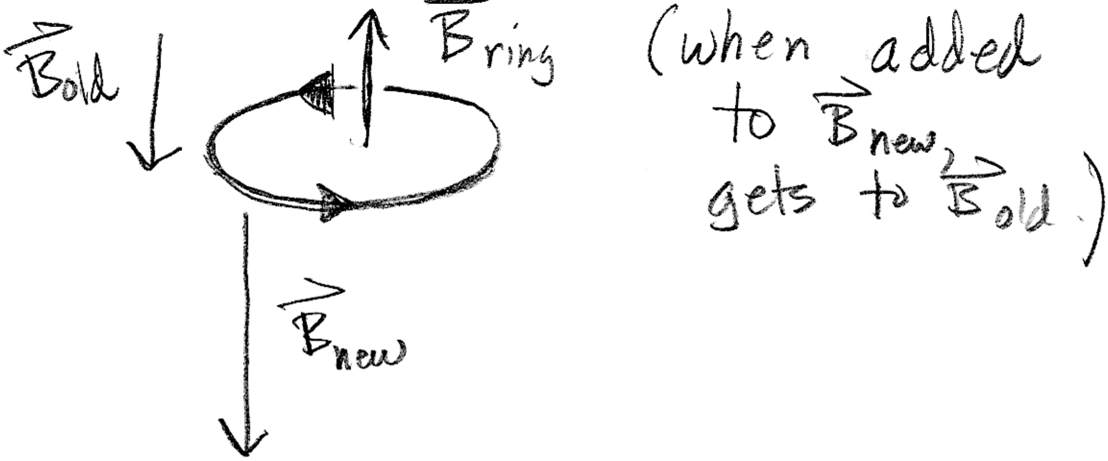


tends to decrease $\vec{B}$!

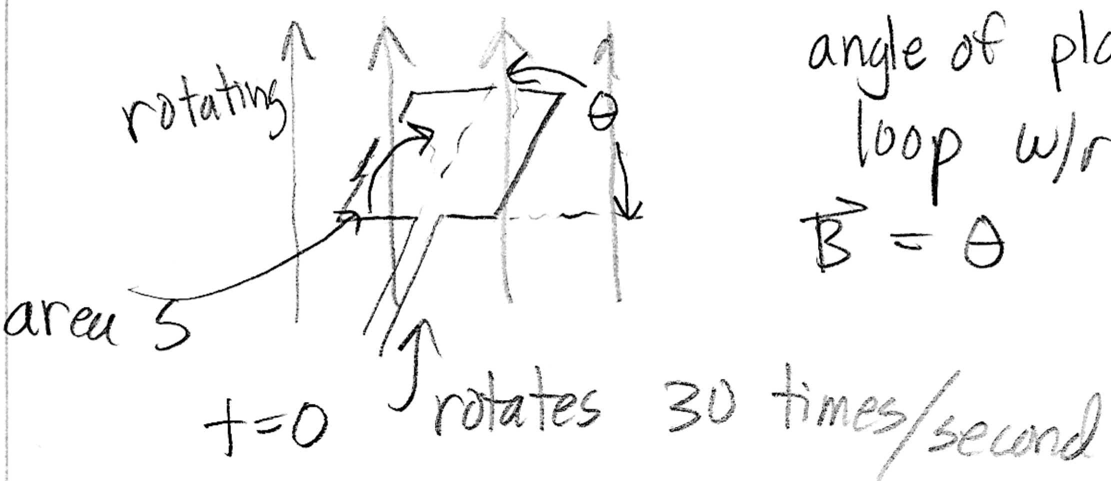
Another Example of Lenz's Law



Loop going from region of weaker, downward pointing $\vec{B}$ field to region of stronger, downward pointing $\vec{B}$ field. Current is induced in the ring that tries to keep the <u>total</u> field (that due to the coil + the ring) as it was



Another visualization: when $\vec{B}$ field lines cut through the loop, current is induced. Direction? Lenz.



angle of plane of loop w/r to $\vec{B} = \theta$

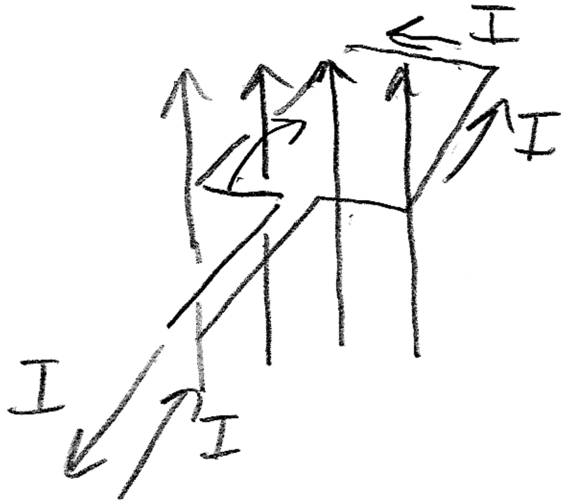
$$\Phi_B(t) = S \cdot B \cdot \sin(\omega t)$$

$$\omega = 2\pi \cdot 30 \simeq 188 \ \frac{\text{rad}}{s}$$

$$\frac{d\Phi_B}{dt} = \omega S B \cos(\omega t)$$

$$\mathcal{E} = -\frac{1}{c}\frac{d\Phi_B}{dt} = -\frac{\omega S B}{c}\cos(\omega t)$$

at instant shown, flux through loop is decreasing; induced current will tend to restore flux (Lenz).



numbers:

$B = 50$ gauss ($\simeq 100 \times$ earth's field)

$S = 80 \ cm^2$

$$\mathcal{E}_{max} = \frac{\left(188 \frac{\text{rad}}{\text{sec}}\right)\cdot\left(80 \ cm^2\right)\left(50 \text{ gauss}\right)}{3 \cdot 10^{10} \ cm/s}$$

$= 2.5 \cdot 10^{-5}$ (gauss-cm = statvolts)

$= 7.5 \cdot 10^{-3}$ volts $= 7.5$ mV