7 April 2009

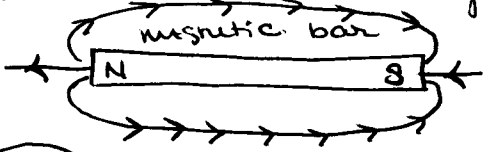
Magnetic fields

* Magnetic & electric fields want to exist in pairs
* always ⊥ to each other

lode stones 

we have a magnetic North Pole – tends to shift
and
magnetic South Pole

* can look at rock layers to see shifting
* magnetic fields always flow North to South



If the bar breaks, it is just smaller. You get a new North & South.

* can disorient a magnet by dropping it OR heating it up.
heating it gives more kinetic energy

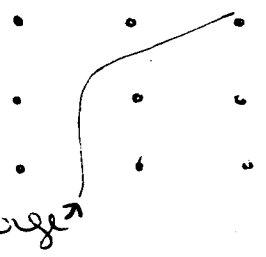
Put a charge in a magnetic field – TWO conditions:

① The charge must be moving.
a stationary charge experiences no magnetic force

② The charge must have some component of its velocity ⊥ to field.

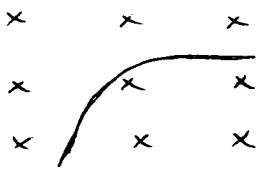
TEST 2 WKS from today!

Right hand Rule field - index
velocity - thumb
force - middle



Dots out

field is coming out towards me of the page



Xs In

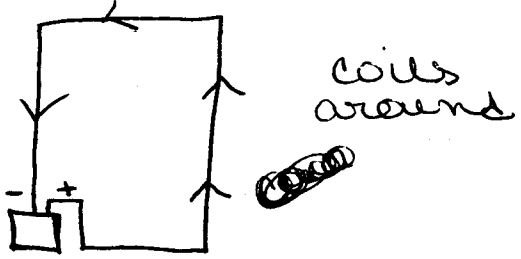
field going towards the page

magnetic fields → $B = \frac{\text{Force}}{q_0 (v \sin\theta)}$ Teslas

Strength of magnetic fields measured in Teslas

Bill Bryson Short History of nearly everything

Anytime a current runs thru wire can produce a magnetic field



μ_0 = permeability of free space = $4\pi \times 10^{-7}$ T·m/A

The closer to the wire, the stronger the field.

DMQ

14 April 2005

Definition of Magnetic Field

$$B = \frac{F}{q_0 (v \sin\theta)}$$

Force on a current in B Field

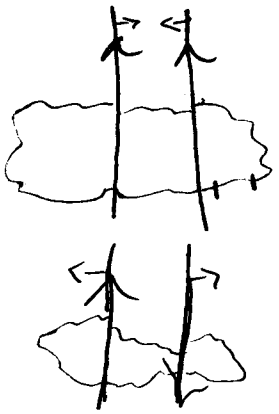
$$F = I l B \sin\theta$$

current — length of wire — strength of mag field

Longer or Thicker the wire the less Resistivity

Ampere's Law

$$\Sigma B_{\parallel} \Delta l = \mu_0 I$$



Δl = distance btw two wire