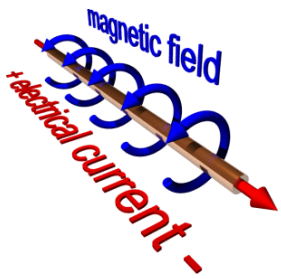
Electromagnetism

Objectives

What is electromagnetism?

Calculate the amount of magnetic force exerted on a current or a moving charge.

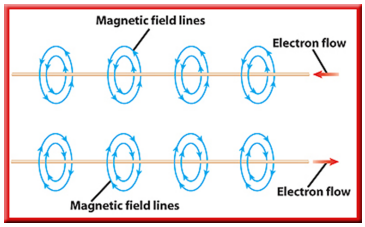
Use the right-hand-rule to determine the direction of the magnetic force.



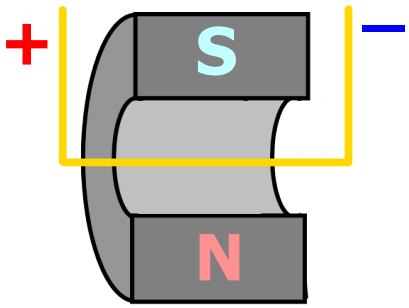
Electromagnetism

Relationship between electricity & magnetism.

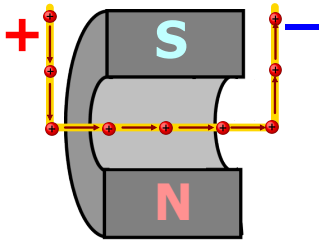
Oersted found current flowing through a wire gives rise to a magnetic field



Magnetic Force



Magnetic Force



When a charge moves through a magnetic field, a force is exerted on it.

Force causes movement! Measured in Newtons (N).

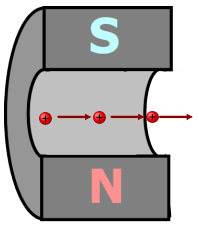
Calculating Magnetic Force

$F_B = I \cdot L \cdot B$

or

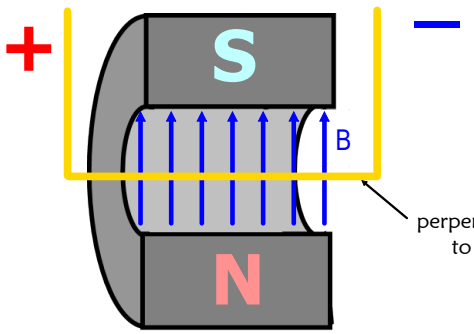
$F_B = q \cdot v \cdot B$

F_B = magnetic force (N)
I = current (amps)
L = Length (m)
B = Strength of Magnetic Field (T for Tesla)



q = charge (C)
v = velocity (m/s)

Magnetic Force



3-D Diagrams of the Magnetic Forces

x axis

y axis

z axis

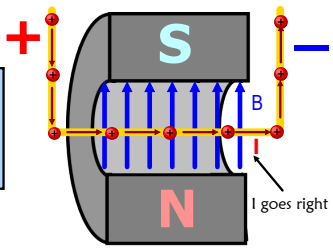
Out

In

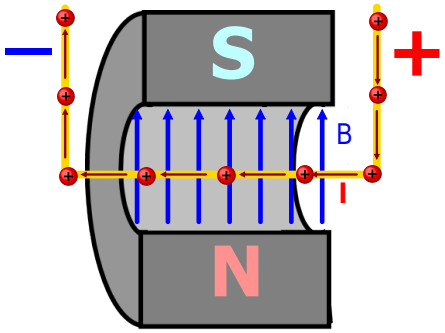
"Right Hand Rule"

Used to determine the direction of force on the wire.

B = fingers - up
I = thumb - right
F_B = palm - ⊙

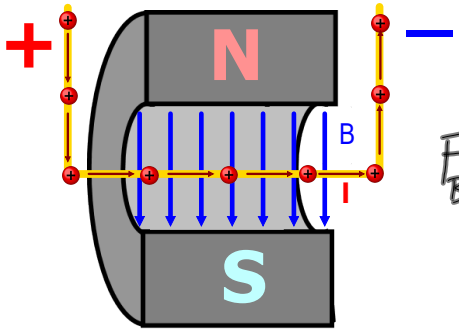


F_B = ?



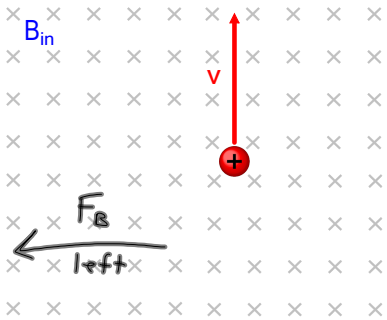
$F_B = X$

F_B = ?



$F_B = X$

F_B = ?



Assignments . . .

- Begin Chapter 36 Homework #1-5