Chapter 16 - Magnetic Fields

Right Hand Rules:

① current carrying conductor → thumb (current)
fingers (field)

② solenoid → fingers (current)
thumb (field)

③ current carrying conductor in magnetic field → fingers (field)
thumb (current)
palm (force)

$F_{mag} = BIl\sin\theta$

- F_{mag}: magnetic field (T)
- I: current (A)
- l: length (m)
- (T) → $\left(\frac{N}{A \cdot m}\right)$

Moving Charge in a magnetic field:

direction of force: → RH Rule → thumb (velocity + charge)
fingers (field)
palm (force)

$F_{mag} = qvB\sin\theta$

- q: charge (C)
- v: velocity (m/s)
- B: magnetic field (T)

Since the charged particle travels on a circular path:

$F_{mag} = F_c$

$qvB = \frac{mv^2}{r}$ ← if the particle is perpendicular to B. (v = velocity of)

You may need to find the velocity (v) by knowing the potential difference (V):

electrical potential energy → $qV = \frac{1}{2}mv^2$ ← kinetic energy

Units: C · Volts

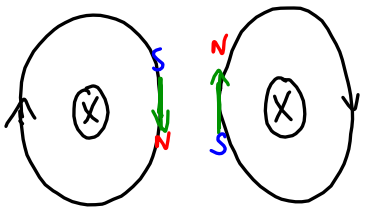
$C \cdot \frac{J}{C}$

Consider two current carrying wires parallel to one another:

⊙ out of board

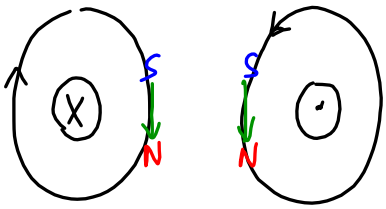
⊗ into the board

Current in same direction (into board):



Since opposites attract, the wires are attracted to one another.

Current goes in opposite directions:



Since like repel one another, the wires repel