Things to Memorize: Magnetic Forces and Fields

Cross Products and the First Right Hand Rule

- To find the magnitude of a cross product like $\vec{A} \times \vec{B}$, multiply $|A| \cdot |B| \cdot \sin(\theta)$
- To find the direction of the resultant vector use the **First Right Hand Rule**:
  - Point your index finger in the direction of the first vector ($\vec{A}$).
  - Bend your middle finger 90° and rotate your arm to point it in the direction of the second vector ($\vec{B}$).
  - Your thumb will point in the direction of the resultant vector.
  - *Note: The resultant vector is always perpendicular to both of the original vectors.*

Magnetic Force

- On a charged particle.
  - Magnetic fields exert forces on **moving, charged** particles.
  - Charged particles tend to move in a **circle** or **helix (spiral)** in a magnetic field.
  - Particles do not feel a force when they travel parallel or antiparallel to the magnetic field.
  - The Magentic Force on a particle is often canceled by an electrostatic force. In this case, particles of only a specific velocity can move through the area without colliding with the walls of the device.
- On a wire carrying current.
  -

Magnetic Fields

- Generated by a current-carrying wire (2nd RHR)
- generated by a loop or coil of wire. (3rd RHR)