Chapter 22

Chapter 22 introduces magnetic fields and magnetic forces. A moving charge will experience a force in a magnetic field if a component of its velocity is perpendicular to the field. Thus, a current-carrying wire may experience a force and a current-carrying loop may experience a torque in a magnetic field as well. Magnetic fields arise from moving charges. The specific fields due to current-carrying straight wires, wire loops and solenoids are examined. Magnetism in matter and the Earth's magnetic field are also discussed.

Objectives
By the end of the chapter, students should understand each of the following and be able to demonstrate their understanding in problem applications as well as in conceptual situations.

- Magnets and the magnetic field
  - **B**.
  - North and south poles
  - Field lines
  - Earth's magnetic field
  - Tesla
  - Gauss
  - Oersted
- Magnetic force
  - Moving charged particle
  - Magnetic force right-hand rule
  - Current-carrying wire
  - Torque on a current-carrying loop
- Magnetic field
  - Magnetic field right-hand rule
  - Long, straight wire
  - Operational definitions of Ampere and the Coulomb.
  - Current loop
  - Solenoid
- Magnetism in matter
  - Ferromagnetic
  - Diamagnetic
  - Magnetic domains
  - Hysteresis
  - Curie Temperature
  - Geomagnetism
- Magnetic effects
  - Hall effect or Hall emf
  - Aurora Borealis
  - Mass spectrometer
- Calculate
  - Force on a moving charge by a magnetic field
  - Torque on a current carrying loop or coil in a magnetic field
  - Work on a moving charge by a magnetic field
  - Magnetic force of one current-carrying wire on another
  - **B** around a straight wire, in a loop of wire and in a solenoid

Assignment:
Look at all of the questions.

Make sure you can do the following problems from Ch. 22:
1, 13, 23, 33, 39, 41, 49, & 55

Please Note: Not all of the material is in the text.